



SAFETY NEWS

A NATIONAL SAFETY COUNCIL PUBLICATION

A SAFER INDUSTRIAL REVOLUTION

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The Journal of the
American Society of Safety Engineers

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MSA's new line of safety eyewear more than fulfills the need for maximum eye protection. And it does so with an obvious flair for *style*. For it's the distinctive styling of the new M-S-A® SIGHTGARD eyewear line that helps you reduce wearer-resistance so successfully.

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One of the most versatile safety boots in any line...sure protection, easy-going comfort, adaptable to many jobs and activities on and off the job...and an outstanding value at a low, low price.

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NATIONAL SAFETY NEWS

A NATIONAL SAFETY COUNCIL PUBLICATION

Vol. 82, No. 5

NOVEMBER 1960

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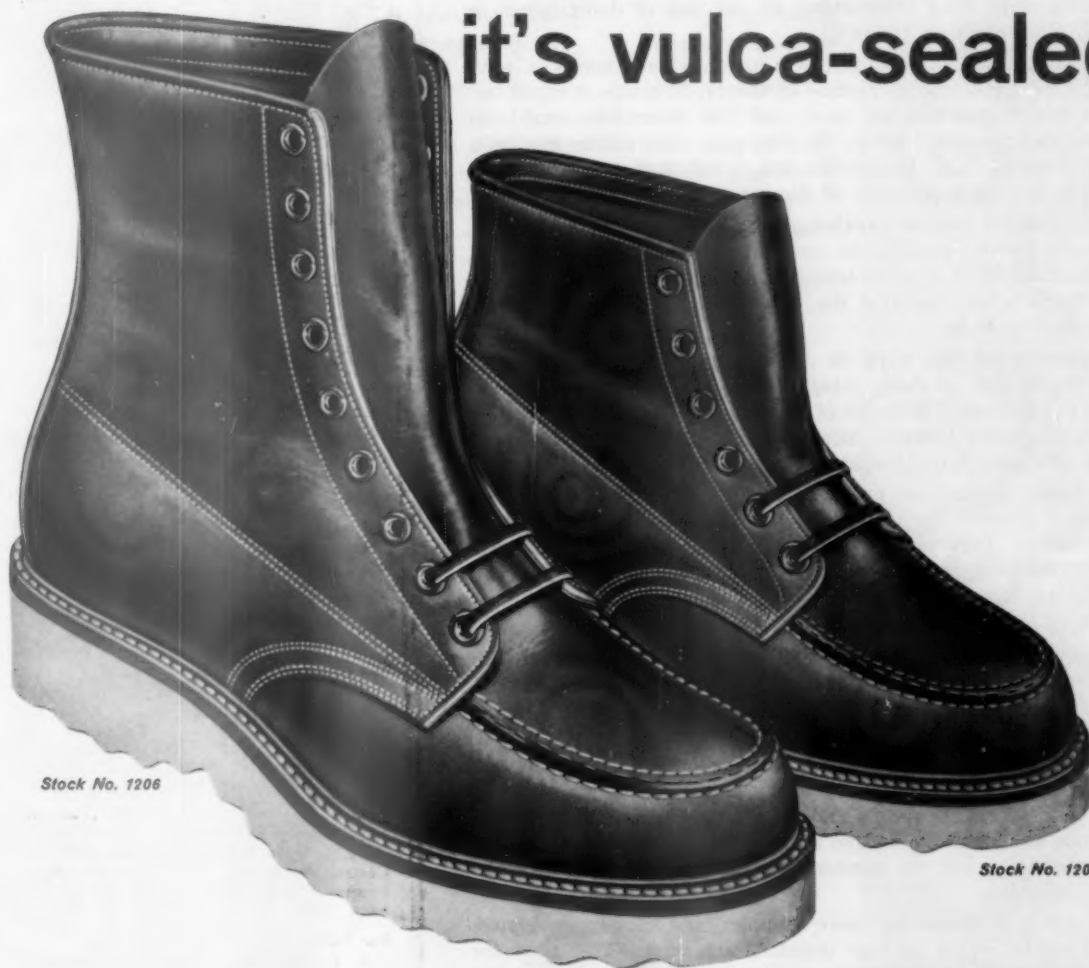
THE COVER

Here are four visitors to the recent Machine Tool Exposition in Chicago. Specialists in machine operation, this quartet is interested in safety factors offered by these tools, as well as production efficiencies involved.

39,500 copies of this issue were printed

National Safety News, November, 1960

it's here!
the leather safety shoe that
keeps feet dry
in any weather because
it's vulca-sealed!



Stock No. 1206

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Cold vulcanizing is the answer! Lehigh's own process of joining cushion-crepe bottom to Sylflex-tanned upper leather effectively ends the "wicking" action that seeps moisture into an otherwise water-repellent shoe—gives greater tensile strength than any ordinary stitched bottom construction! Gives leather-shoe comfort, too, because the upper "breathes" as only leather can, yet turns water like a duck's back. Great for all outdoor jobs or wet-floor departments where rubbers or galoshes are a handicap and a hazard. Test them on your own jobs. They're the nearest thing to boots ever developed in leather!



EDITORIAL

United We Act

ONE OF THE THINGS that impresses visitors to this country is our custom of forming associations and holding meetings. At present there are some 200,000 voluntary organizations, labeled associations, councils, institutes, clubs, societies, and lodges.

These perform duties not carried on by private enterprise or by the government. They fill gaps in our social and economic structure. Their voluntary effort serves as a lubricant that keeps our society functioning.

This trend was already evident some 125 years ago when a much-quoted Frenchman, Alexis de Tocqueville, visited this country and made some penetrating observations on our way of doing things in his book, *Democracy in America*.

De Tocqueville concluded that in a nation where powers of government are limited and everyone—in theory, at least—is equal before the law, individuals are weak and find themselves unable to carry out large projects alone. So they join with others having a common purpose. De Tocqueville concluded that action through association is a basic principle of democracy.

De Tocqueville reached another conclusion—that one product of this love of equality peculiar to democratic peoples is the tendency toward centralization of government. Men seek government help for their projects while deploring the trend. What would De Tocqueville think of us today!

The remedy for this trend to centralized operation and control is the obvious one of doing things for ourselves. And this means through associations. The forces of organized safety working through the National Safety Council, local councils, trade associations, and other groups provide a conspicuous example of voluntary effort.

A dynamic association needs frequent and well-planned meetings. These provide the cohesion binding members together in a common effort. They provide, too, a renewal of the faith and enthusiasm that brought the association into being. Who can appraise the value of National Safety Congresses to the safety movement since 1912?

The personal contacts through these meetings and through association work generally are of immense value. Being acquainted with other members of an association—often on a first-name basis—is good for the individual and the group as a whole.

Through meetings the work and achievement of an association, as well as the problems and challenges to be faced, are communicated to members. In formal and informal discussions, a vast fund of common knowledge is put into circulation. The depth and breadth of this knowledge and the standardization of practices are products of communication.

Our society is becoming more complex and closely integrated, with increasing strain on our decentralized setup. The need for better horizontal communication is becoming increasingly urgent. We must learn more and more about still more and more.

This suggests the need for getting together more frequently or more effectively—or both.

Be a responsible citizen—Vote November 8

NATIONAL SAFETY COUNCIL

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National Safety News, November, 1960

New and Revolutionary... SLING CHAINS THAT TALK

The **WARNING RING** on Campbell **SENTRY SLINGS*** tells you immediately when the sling has been overloaded . . . it elongates visibly . . . and before the chain itself is damaged.

Your eye can see the difference!

◀ Ring remains round
Sling used properly

▶ Ring distorted
Sling overloaded

New, revolutionary . . . Campbell **SENTRY SLINGS**—fully tested for over a year by foundries, steel fabricators and heavy equipment manufacturers, offer many important advantages. The **WARNING RING** is stronger than the chain itself. Yet it changes shape as the sling is overloaded . . . *before permanent damage occurs*. Repair is quick and easy, with a new **WARNING RING** replaced at the factory. Re-tested and re-certified Sentry Slings are again ready for regular service.

Here's How You Benefit From New **SENTRY SLINGS**:

- Safety programs are easier to maintain—with the **WARNING RING**'s built-in safety that protects men and material!
- Lower repair costs give larger savings than ever—normally only the **WARNING RING** will need repair!
- Immediate visual evidence of overload means easier inspection—even while sling is in use!

SENTRY SLINGS, available in all types, are made from Cam-Alloy steel chain only and are available at no extra cost! All slings carry the Campbell Guarantee and Certificate of Test.



CAMPBELL CHAIN *Company*

FACTORIES: York, Pa.; West Burlington, Iowa; Union City, Calif. **WAREHOUSES:** East Cambridge, Mass.; Atlanta, Ga.; Dallas, Texas; Chicago, Ill.; Portland, Ore.; Seattle, Wash.; Los Angeles, Calif.

*Patent Applied For

THE SAFETY VALVE



Nothing human is alien to me

—TERENCE

VETERAN'S DAY

*Oh valiant hearts who to your glory came
Through dust of conflict and through battle flame
Tranquil you lie, your knightly valor proved;
Your memory hallowed in the land you loved.*

—J. S. ARKWRIGHT

THE FALL SCENE

NOW THAT the World Series is over and peace has returned to Forbes Field and the Golden Triangle, we can settle down to the serious business of electing a president—and, of course, preventing accidents.

Summer, officially, is over when the sun crosses the Tropic of Cancer, but to me it always seems to hang around for the final out of the World Series. This year it went out with a bang as Bill Mazeroski belted the ball over the left field fence and trotted across the plate with the Pirates' winning run. Walking home from the train that night it seemed to me the foliage had changed color since morning.

That final game, ending one of the weirdest contests in baseball history, left millions of TV and radio fans limp and exhausted. Probably no team had ever been beaten so decisively and come back fighting.

Turning to the political scene, national and international, we have been watching the antics of two repulsive characters at the United Nations trying to win the world over to the communist camp, a situation complicated by the emergence of several new nations still exhilarated by the heady brew of independence (not necessarily the same as freedom).

On the home front we are being treated to the show of the century—a series of debates between the presidential postulants over TV. Probably the idea was inspired by the Lincoln-Douglas debates of a century ago.

Unfortunately, the candidate who tries to win the millions via the boob box is more likely to be judged by his voice and platform manner and how well he looks to the camera than by the soundness of his arguments. Just how many people are influenced by these performances is uncertain. Judging from the newspaper polls, each person is convinced that his boy came out best. And, like a baseball game, the score may be decided on errors rather than earned runs.

It's a grueling experience for men, one of whose energies will be needed during the next four years in the world's most exacting job—not overlooking Mr. Hammarkjold's.

In our own field, we are faced with the problem of attaining the goal we have set for ourselves: "SAFETY

EVERYWHERE—all the time!" This promises to be hardly less difficult, if less spectacular, than that of maintaining peace and prosperity at home or keeping peace in a turbulent family of nations.

For a parting thought: "Be a Responsible citizen—Vote November 8." For readers in other countries, vote whenever your next election happens to be.

And remember, city council and school board elections are important, too.

CRITICISM OR FAULT FINDING?

ACCORDING TO an old bromide, it's easy to criticize. Really, it isn't. Too many people don't know the difference between criticism and fault finding.

At best, correcting a subordinate is a disagreeable job. So the boss dodges it until pressure builds up and he finally blows his top. That's bad for his blood pressure and the group morale.

Psychologists offer these hints for dishing out criticism with maximum effectiveness and minimum pain:

1. Get the facts. They may indicate that a reprimand isn't needed.
2. Weigh the extenuating circumstances.
3. Keep your temper under control.
4. And finally, plan the interview. Know the questions you want to ask. Have an easy opening—one that won't put the employee on the defensive.

Effective criticism requires a sympathetic understanding of people in general and the fellow on the carpet in particular.

FORMULA FOR SUCCESS

OUTSTANDING SUCCESS STORY of today in the Horatio Alger pattern is that of R. G. Le Tourneau, who left school at the age of 14 and eventually became leader of a gigantic earth-moving machinery company. In his autobiography, *Mover of Men and Mountains*, he indulges in some interesting forecasts about how earth-moving machines will move the face of the earth.

LeTourneau credits his success to his widely publicized partnership with God, plus a bold, impatient imagination.

"One thing I've learned about engineering," he says, "is that if you ever are ready to rest on your laurels, you sit down on a chair that isn't there."

You can say that about safety work—and editing, too.

INSPIRATION FROM TERENCE

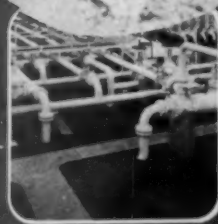
"IN MY OFFICE I have pasted a little notice stolen from your 'Safety Valve' column," writes George Matwes, safety director for Bamberger's Department store in Newark, N. J.:

Nothing human is alien to me.—TERENCE.

Nothing human is suprising to me.—MATWES.

Carman Fish

the answer to industrial weed problems




any man can weed-proof 10,000 sq. ft. in ten minutes

with **UREABOR[®]** This is the weed killer that's setting new standards for big economy with maintenance men from coast to coast. During the past six years, users have proved that, for low cost, safety, effectiveness... ease of application... UREABOR can't be beat!

Here is the dry granular weed-killing material that is always ready for you to use. There's nothing to mix — no water to haul. To destroy unsightly and hazardous weeds and grasses for a full season, you'll only use 1 to 2-lbs. per 100 sq. ft. That's because UREABOR combines the plant-destroying powers of *two* proven herbicides to

give both a quick kill *and* a long-lasting control.

A special spreader is made to apply UREABOR uniformly and fast at low rates. Its low-cost does not reflect the tremendous value of this spreader to any user of UREABOR since it enables a man to weed-proof any area at the rate of a thousand feet per minute! If you have a weed problem, we want you to have the full story about UREABOR weed killer. Write today for details and name of a near-by distributor.

 **USBORAX**

UNITED STATES BORAX & CHEMICAL CORPORATION, Agricultural Sales Dept., 630 Shatto Place, Los Angeles, California



The fight for safety will be won or lost at the local level, Walter K. Koch tells Annual Meeting. Left to right, seated: William H. Lowe, newly elected chairman, Board of Directors; Howard Pyle, president; General George C. Stewart executive vice-president.

Reinforce Our Front Line, 1960 Congress Told

PROGRESS toward the goal of "SAFETY EVERYWHERE . . . all the time" will depend on the effectiveness of safety's front line fighters—the men and women who are directing and supporting the state and community safety councils.

This point was stressed in the addresses of Walter K. Koch, president of the Mountain States Telephone & Telegraph Company, and retiring vice-president for state and local safety organizations, National Safety Council, and Howard Pyle, Council president, at the Annual Council Meeting which opened the 1960 National Safety Congress, Monday morning, October 17.

"It is at the local level that our goals can be achieved or our efforts nullified," said Mr. Koch. "After all, our national safety problem is merely the sum total of all the local safety problems. Accidents happen where people live, and this fact underlies the importance of strong state and community councils—organizations that fight the safety problems in the front lines."

Basically, he said our continuing problems are:

1. To expand the number of state and local organizations.
2. To help these organizations in every way possible to make their work effective.

President Pyle emphasized the fact that the Council was not seeking large sums for the exploration of

unknown areas. Adequate support was needed for the extension of "applied safety" through media and methods that had already proved their effectiveness in certain areas.

In his annual report, General George C. Stewart, executive vice-president, spoke of the distorted image of the Council which is so prevalent. The Council, he said, is variously regarded as a government organization, an instrument of big business, an organization with legislative and police powers, and the office that issues the holiday traffic toll forecasts. Comparatively little is known of its organizational structure and its many constructive activities. He urged members to study the Council's Annual Report to the Nation, *Accident Prevention Works*, copies of which had been distributed at the meeting, and help in enlightening the public.

Officers elected. Several new officers were elected to replace those who had served long and faithfully.

Among the vice-presidents, the following changes were announced:

William H. Lowe, for several years Vice-President for Finance, was elected chairman of the Board of Directors. Mr. Lowe, treasurer of Inland Steel Company, succeeding Walter F. Carey.

J. H. Schwarten, vice-president for finance and treasurer, City Products Corp., succeeding William H. Lowe as Vice-President for Finance.

Harry L. Powell, assistant to vice-president, The Goodyear Tire & Rubber Company, succeeding Kirk Fox as Vice-President for Farms.

Walter E. Montgomery, safety director, Quebec Asbestos Mining Association, succeeding Dr. Earle S. Hannaford as Vice-President for Industry.

Lloyd D. Utter, director, Industrial Health and Safety Division, United Automobile Workers, succeeding P. L. Siemiller as Vice-President for Labor.

H. G. Mangelsdorf, Standard Oil Company (N. J.), succeeding Walter K. Koch as Vice-President for State and Local Safety Organizations.

John Gillis, vice-president, Monsanto Chemical Company, succeeding Edward C. Myers as Vice-President for Membership.

Mark Robeson, president, Yellow Transit Freight Lines, succeeding E. J. Buhner as Vice-President for Motor Transport.

Robert R. Burton, senior vice-president, Kenyon & Eckhardt, Inc., succeeding Wesley I. Nunn as Vice-President for Production.

Mrs. Raymond Sayre, chairman, Women's Group, The President's Committee for Traffic Safety, succeeding Miss Marion E. Martin as Vice-President for Women.

A complete list of officers, trustees and directors elected at the Congress will be found on page 56.

Because of publication deadlines, this report of the Congress ends with the Annual Meeting. More next month.

Next year: The 1961 National Safety Congress and Exposition will be held October 16-20. Headquarters will be at the Conrad Hilton with meetings in other hotels.

**Willson
Contour-Specs®
help Boeing
cut eye injuries
more than 65%**

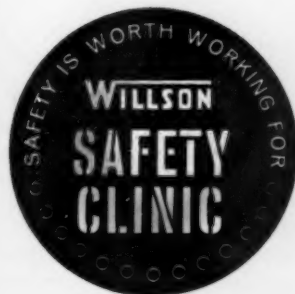
Three years ago, an average of 5.8 eye injuries for every 100 manufacturing employees was costing Boeing Airplane Company over 3000 hours of lost production annually in its Transport Division at Renton, Washington . . . enough time to complete several final assemblies for 707 jet transports worth more than \$5,000,000 each.

Today, only two years after Willson Contour-Specs were adopted for Boeing's enlarged mandatory eye-protection program, eye injuries average only 1.6 per 100 employees—more than a 65% reduction.

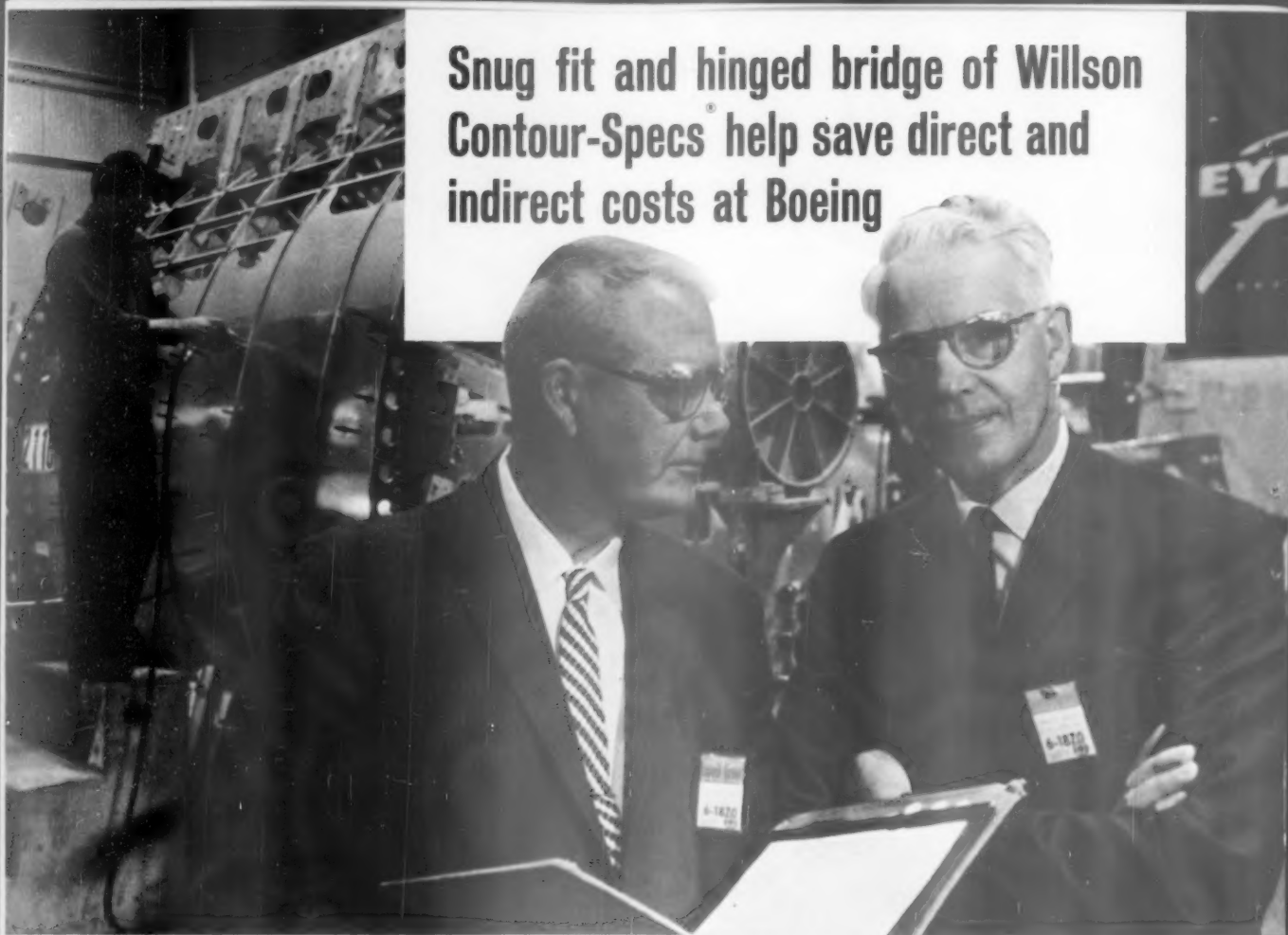
In addition to improved safety, Boeing benefits from increased human comfort, increased employee morale, and increased production efficiency. And . . . costs of compensation and lost production time have *decreased*.

For more information on *how* Willson Contour-Specs can improve both safety and acceptance of your eye-protection program, please turn the page.

WILLSON®



Snug fit and hinged bridge of Willson Contour-Specs® help save direct and indirect costs at Boeing



At Boeing, where 707 jet transports are made, figures for eye injuries reported include total number of first-aid eye treatments—even when no injury results. Actual injury incidence is not as high as the report might imply.

Almost 100% eye enclosure is necessary in shops like Boeing's where a large percentage of drilling, reaming, and riveting is done at or above eye level. Contour-Specs, because of their hinged-bridge feature, adjust closely to the face. Snugged-up plastic side-shields and extended nose pads close the gap between spectacle frames and workers' skin. With full 360° eye protection, minute particles can't fall, drift, or blow into eyes. The nose pads and side-shields make the Contour-Spec the finest kind of pro-

tection even on jobs where ordinary safety glasses are not adequate.

Contour-Specs protect team efficiency

Boeing's studies show that its eye program increases production appreciably. The average dispensary visit takes 25 minutes, and a second visit normally is required. But, the average of 50 minutes per injury represents only half the actual production time lost from each injury. Since many employees work in teams—such as a riveter and his buckler, or a mechanic

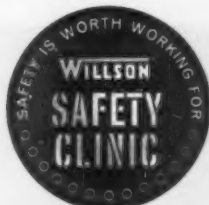
and his helper—productivity goes down drastically when one worker goes to the dispensary. Almost two full man-hours are lost as the result of a single injury. With reliable Contour-Specs, Boeing avoids both excessive cost and human grief.

The hinged bridge fits most nose and face shapes, so Contour-Specs replace up to ten sizes of conventional safety glasses. Time and money normally spent for complete inventories and individual fittings are saved.

Willson representative Richard R. Rice of Safety & Supply Co., Seattle, works closely with Boeing officials on all aspects of safety. Your Willson distributor will be glad to demonstrate how Contour-Specs can improve safety, initiate important new savings, and simplify your company's eye-protection program.



Contour-Specs are available with popular P3 or F7 lens shapes, green or flesh-colored frames and side-shields, with pre-shaped plastic-cable temples.



WILLSON®

Willson Products Division
Rite-O-Vac Company
Reading, Pennsylvania
In Canada: Safety Supply Company

SAFETY is worth working for



WIRE FROM WASHINGTON

By HARRY N. ROSENFELD

Washington Counsel, National Safety Council

WASHINGTON has a way of holding its breath, and much of its normal activities during the quadrennial period of presidential campaigning. This situation affects safety matters.

Industrial Safety. The average of the monthly injury rates in manufacturing for the first six months of 1960 was 11.1, according to the U. S. Department of Labor's Bureau of Labor Statistics. This was 3 per cent below average for the first half of 1959, but 6 per cent above the comparable 1958 figure.

The U. S. Bureau of Mines reported that the injury frequency rate in the nation's coal mines was 3 per cent higher for the first six months of 1960 than for the same period in the preceding year. The rate of occurrence was 1.16 for the first six months of 1960. The 1960 six-month period also witnessed a 13 per cent increase in the number of fatalities and a 23 per cent increase in frequency of fatalities over the comparable 1959 period. Preliminary 1959 figures were also made available by the Bureau of Mines on work injuries in the mineral-extractive industries.

Frequency of injuries to production, development, and related workers in these industries declined nearly 5 per cent below the level of the 1958 final rate. Six of the 12 industrial groups covered by this report recorded a reduction in the combined fatal and nonfatal injury frequency rate in 1959 over that of 1958.

These industries were: coal mining, from 45.05 in 1958 to 44.09 in 1959; petroleum and natural gas from 9.63 to 9.00; metal mining, from 32.59 to 31.73; stone quarrying, from 24.71 to 23.69; metallic ore-dressing plants, from 11.24 to 9.24; and nonferrous reduction

This report is an information service. Publication does not imply National Safety Council approval of or opposition to any legislation mentioned

plants and refineries, from 14.77 to 9.98.

The Atomic Energy Commission called on the various states to "play a more active role than ever in the formation of radiation standards." For the protection of the public health and safety, said AEC, "it is vital that federal and state radiation standards be coordinated and compatible."

International atomic energy considerations are worth mention. The United States urged the International Atomic Energy Agency in Vienna, Austria, to continue its programs of technical assistance in health and safety areas, with special stress on reactor safety, appropriate international standards for health and safety, and the study of disposal of radioactive wastes.

In a message to the Fourth Conference of the International Agency, President Eisenhower said the

IAEA "has a paramount role in the development of the necessary health and safety standards."

Air pollution continued to be an important item of federal concern.

The U. S. Public Health Service created a new Division of Air Pollution, which will consolidate research, technical assistance, and training activities in what the Surgeon General called "this expanding field of nationwide public health concern."

He said it is "clear that the nationwide threat of air pollution is becoming greater." The new division will establish a Laboratory of Medical and Biological Sciences to deal with medical and agricultural research and a Laboratory of Engineering and Physical Sciences to study the nature, sources, and effects of air pollution on the physi-

—To page 68

THE MONTH IN WASHINGTON

- Average monthly injury rates in manufacturing for first six months of 1960 was 11.1—3 per cent below average for first half of 1959, but 6 per cent above comparable 1958 figure.
- U. S. Public Health Service creates Division of Air Pollution to conduct medical and agricultural research, to study nature, sources, effects of air pollution on physical environment, and to develop control methods.
- Federal Aviation Administration urges more attention to safety for conventional and piston aircraft, with increase in fatality rates from 0.45 in 1958 to 0.72 deaths per 100-million passenger miles in 1959. FAA proposes regulations to establish unified requirements applicable to construction or alteration of structures affecting safety of aircraft in flight—tall buildings, smokestacks, and similar obstructions.
- U. S. Commissioner of Foods and Drugs issues report on efforts to curb illegal sales of "pep pills" to truck drivers and motorists.

9 PIONEER GLOVES PROMOTE

PRODUCT CARE!

To keep work rolling when the product needs protection from handling, use Pioneer Nimble Fingers™ or Sheergrip® Gloves. Styles in neoprene, latex or Pylox™ blend dexterity with durability in the right degree for your job. Selection is easiest from the Pioneer Industrial Glove Wall Chart (all 59 styles). For your free copy, write ...

PIONEER

The Pioneer Rubber Company, 237 Tiffin Road, Willard, Ohio

26 PIONEER GLOVES COMBAT

ABRASION!

All 59 Pioneer Glove styles are job-smart; like Neoprene Coated "Pacemakers" and Pylox Coated "Stanflex"... built to give you better output with more work-hours per glove and more comfort-hours per worker. There are 26 different Pioneer styles especially for abrasion protection on heavy rough materials-handling jobs. Pioneer has the right glove for the job. You can easily select the right Pioneer glove for your job by sending for the Foolproof Pioneer Glove Selector... It's free... and easy!

PIONEER

The Pioneer Rubber Company, 237 Tiffin Road, Willard, Ohio

21 PIONEER GLOVES COMBAT

CHEMICALS!

There's a Pioneer glove to protect workers from chemicals, chemical burns or hand dermatitis. Of the 59 Pioneer Glove styles, 21 are designed to give long service in at least 103 basic oils, greases, acids, solvents and other chemicals. This includes all of the long-wearing Milled Neoprene Pioneer styles that bear this recognized Pioneer trademark.



The Pioneer Rubber Company, 237 Tiffin Road, Willard, Ohio

5 PIONEER GLOVES COMBAT

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THE SAFETY LIBRARY



Reviews of books, pamphlets and periodical articles of interest to safety men

By LOIS ZEARING, Librarian, NSC

Air Sampling Instruments

Air Sampling Instruments. Published by the American Conference of Governmental Industrial Hygienists, 1014 Broadway, Cincinnati 2, Ohio, 1960. \$7.50.

IN MAY, 1954, a symposium on Instrumentation for Industrial Hygiene was held by the University of Michigan, Institute of Industrial Health and School of Public Health.

As the result of this meeting and through the cooperative efforts of many individuals and groups, the *Encyclopedia of Instrumentation for Industrial Hygiene* was published in 1956. This extensive publication, with seven sections totaling 1,243 pages, contains descriptive information of all instruments exhibited at this symposium.

The revision of this encyclopedia's Section 1—Instruments for Sampling and Analyzing Air Contaminants in Industrial Environments—was undertaken by the Committee of Air Sampling Instruments of the American Conference of Governmental Industrial Hygienists.

The following papers originally published in this encyclopedia are included unchanged in *Air Sampling Instruments*: "Sampling and Analyzing Air for Contaminants in Work Places," by Leslie Silverman; "Home-Assembled Instruments," by Alfred N. Setterlind; "Instruments for Sampling and Analyzing Organic Vapors in Air," by E. M. Adams; "A New Condensation Nuclei Meter," by T. A. Rich; "Developments in the Sampling of Air-Borne Dust," by Theodore Hatch; "The Calibration of Gas, Vapor, and Dust Instruments—Their Accuracy and Sensitivity," by E. W. Gilliland; and "Filter Media for Air Sampling," by Leslie A. Chambers.

About 60 descriptions of new equipment have been added to this manual. The instruments are grouped as: Impingement Sampling Devices, Filter Media Samplers, Impaction Devices, Direct Reading Instruments,

Gas and Vapor Samplers, Colorimetric Gas and Vapor Detectors, Electrostatic Precipitators, Thermal Precipitators, or Miscellaneous Equipment.

It is intended to revise the information contained in this manual every two years and include the latest instruments developed. The manual on *Air Sampling Instruments* should aid those engaged in industrial hygiene work in the selection and use of the proper sampling instruments.

J. T. SIEDLECKI

BOOKS AND PAMPHLETS

Aeronautics

Resume of Accidents, U. S. Air Carriers, Rotocraft and Large General Aviation Aircraft, Calendar Year 1959. 1960. 55pp. Civil Aeronautics Board, Washington 25, D. C.

Chemicals

Benzoyl Peroxide, Properties and Essential Information for Safe Handling and Use. 1960. 10pp. Manufacturing Chemists' Association, 1825 Connecticut Ave., N. W., Washington 9, D. C. (Chemical Safety Data Sheet SD-81.) Price 30¢.

Butzaldehydes, Properties and Essential Information for Safe Handling and Use. 1960. 14pp. Manufacturing Chemists' Association, 1825 Connecticut Ave., N. W., Washington 9, D. C. (Chemical Safety Data Sheet SD-80.) Price 30¢.

Chlorine, Properties and Essential Information for Safe Handling and Use. 1960. 25pp. Manufacturing Chemists' Association, 1825 Connecticut Ave., N. W., Washington 9, D. C. (Chemical Safety Data Sheet SD-80.) Price 30¢.

Formaldehyde, Properties and Essential Information for Safe Handling and Use. 1960. 14pp. Manufacturing Chemists' Association, 1825 Connecticut Ave., N. W., Washington 9, D. C. (Chemical Safety Data Sheet SD-1.) Price 30¢.

Directory

Standardization Activities in the United States: A Descriptive Directory. U. S. Department of Commerce, National Bureau of Standards. 1960. 210 pp. Superintendent of Documents, Washington 25, D. C. Price \$1.75. (Miscellaneous Publication 230.)

Disasters

1960 Property Insurance Fact Book. 36pp. Insurance Information Institute, 60 John St., New York 38.

Flammable Liquids

Flammable Liquids: Storage and Handling of Drum Lots and Smaller Quantities, Recommended Safe Practices and Procedures. 1960. Manufacturing Chemists' Association, 1825 Connecticut Ave., N. W., Washington 9, D. C. (Safety Guide SG-3.) Price 20¢.

Lighting

Recommended Practice for Office Lighting. 1960. 35pp. Illuminating Engineering Society, 1860 Broadway, New York 23. Price 50¢.

Mining

Evaluating Anchorage Testing Methods for Expansion Type Mine Roof Bolts. 1960. 19pp. Publications Distribution Section, U. S. Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa. (Report of Investigation 5649.)

National First-Aid and Mine Rescue Contest, Buffalo, N. Y. October 5-7, 1959. 1960. 97pp. Publications Distribution Section, U. S. Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa.

The National Safety Competition of 1948-58. U. S. Bureau of Mines. 1960. 195pp. Superintendent of Documents, Washington 25, D. C. (Information Circular 7960.) Price \$1.

Sulfur in Lignite: Form and Transformations on Thermal Treatment. 1960. 15 pp. Publications Distribution Section, U. S. Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa. (Report of Investigation 5626.)

Radiation

Delayed Effects of Whole-Bodied Radiation. Bernard B. Watson. 1960. 80pp. The Johns Hopkins Press, Homewood, Baltimore 18, Md. Price \$4.50.

Radioisotopes in Science and Industry: A Special Report of the U. S. Atomic Energy Commission. 1960.

—To page 76

**If this happens in your plant
be sure it is not your fault.**

Official government statistics show 27% of industry accidents are eye accidents. 2% are injuries to eyes and an additional 25% are caused by poor vision due to faulty eye protection. These accidents cost industry more than \$475 million a year. For goggles and glasses stay dirty and dangerous unless you make it easy as possible for workmen to clean them *on the job*. Further, foul sight holds back production 25% to 40%. No wonder it is your Number One safety-efficiency problem.

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MAGIC Silicone
Lens Tissue

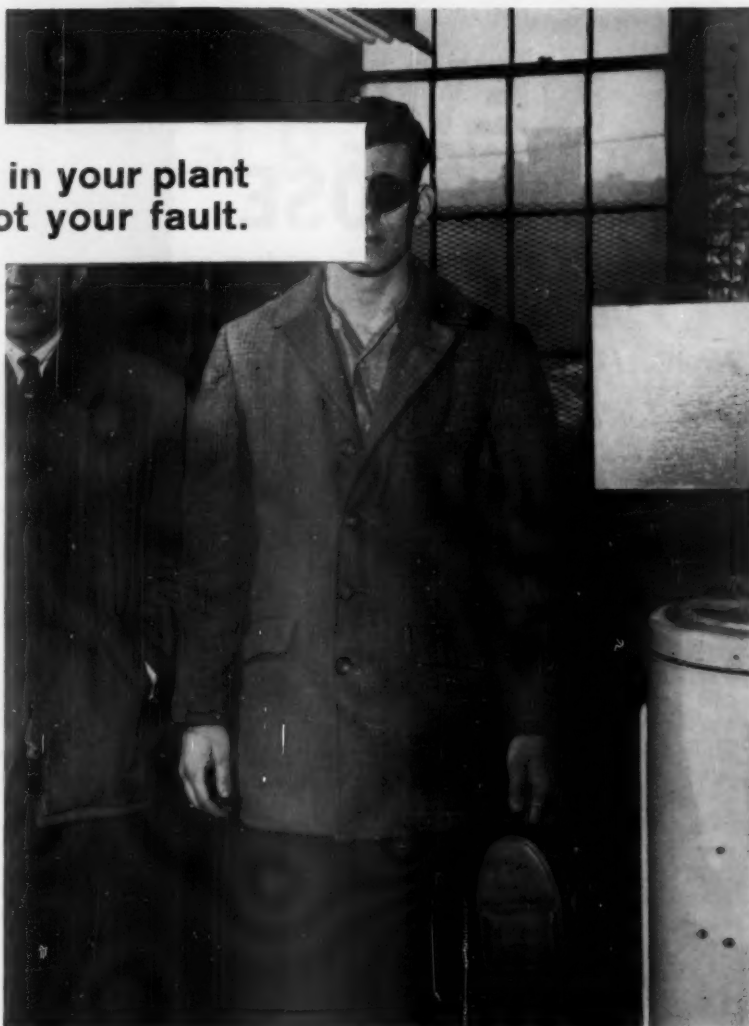


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*Monoammoniumphosphate treated with a silicon resin.

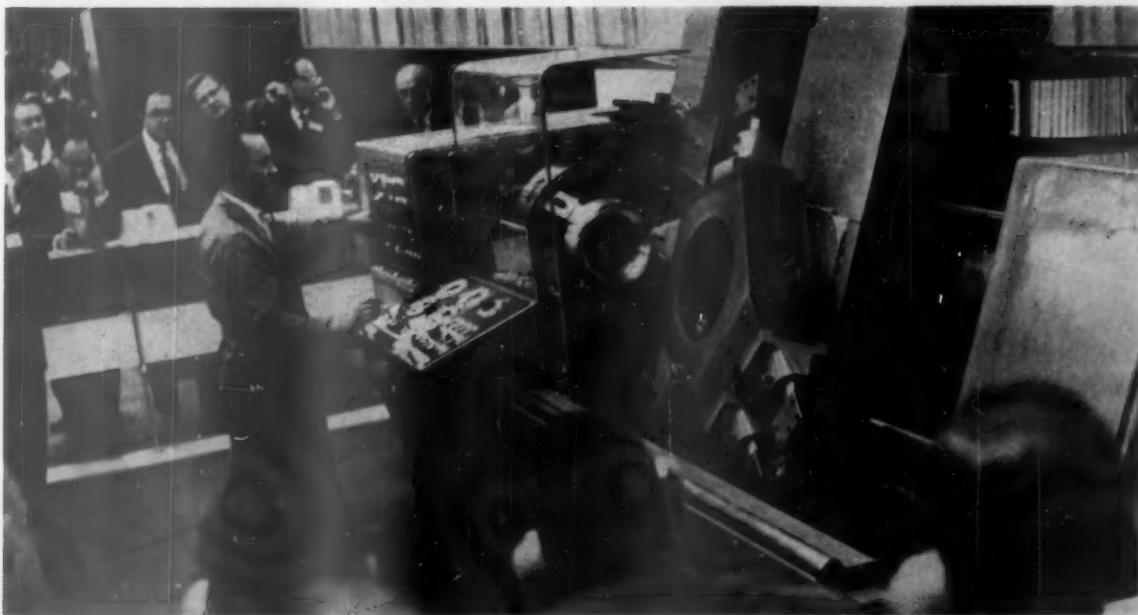


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A SAFER

Industrial Revolution

A hybrid, one that grew out of the mating of the computer and the automated machine, would have taken the blue ribbons if the Machine Tool Exposition had awarded them



Photography by Jim Lehman, NSC staff photographer

Above: With a few deft flicks of the wrist, the operator sets up this turret lathe. It has a 25-in. diameter swing. The control console at the operator's right hand rolls out of the way, as does the clear plastic guard. The operator is clear of the point of operation.

Right: After the first piece is turned, this metal tape takes over and repeats. Operator need check only for tool wear. On automatic control, manual controls are inoperative, and on manual control, automatic controls are inoperative.

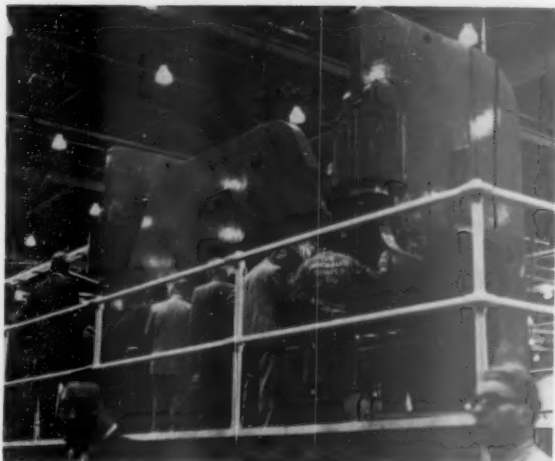


SCENE of many a livestock show, Chicago's International Amphitheater echoed to the screech of overloaded cutting tools ("They like to see the chips fly," one demonstrator said) and reverberated to the thump of bigger, faster presses.

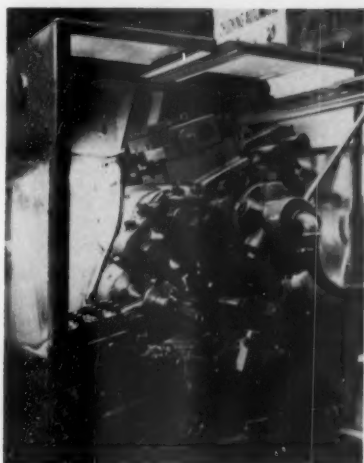
This was the Machine Tool Exposition, so big it can be staged only twice in a decade. There were 11,000 places to look.

Numerical control stole the show. An operator makes a work piece, then a steel tape in a glass cabinet takes over and runs the machine. The operator is no longer exposed to hazards. On the turret lathe above, the operator has no hand wheels to turn. There are no levers in the operating area. Operator fatigue is reduced to a minimum. Levers move the twin turrets up and down or traverse. —Turn page

machines for big jobs . . . and for small jobs



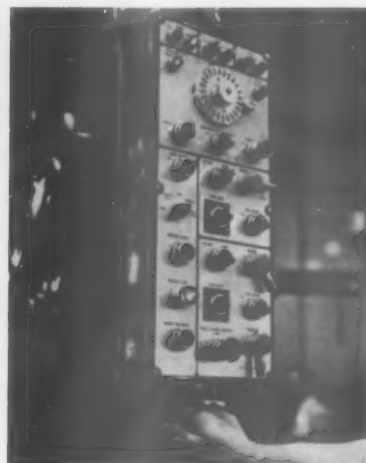
automatic chucking



plastic chip guard



control panel for milling machine



**arty photography
through the bed area
of a
large power press**



NSNews reporter pesters profiler



men and machines were everywhere



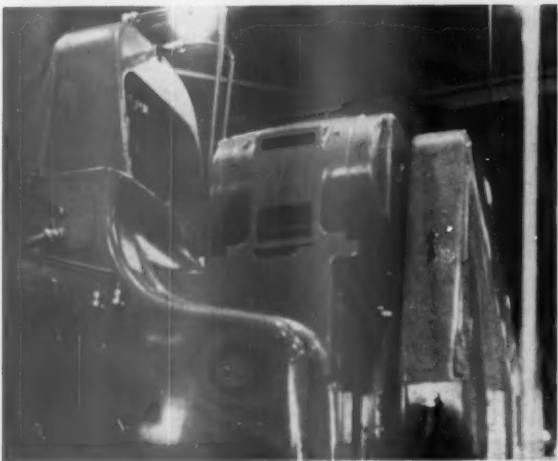
engine lathe turns a large shaft



shaper has well-designed chip guard



guarding is built in here



manufacturer provides a safety message





Union Electric employees are instructed in the chemistry of fire and principles of extinguishment before demonstrating apparatus on actual fires.

By-products of combustion are deadly so trainees receive instruction in use of canister masks.

It's No Good Without Know-How

A trained force to man efficient fire-fighting equipment is the aim of Union Electric's program

By JAMES D. HOAG
Manager, Safety Division, and

RAY W. HACKER
Training Assistant, Union Electric Company, St. Louis, Mo.

MANY COMPANIES have found that the best equipment is valueless unless people know how to operate it. They learned this elementary lesson the hard way. Whether it's a fireman or a fire extinguisher, it won't do a bit of good unless you know how to use it.

Many companies have the best fire-fighting equipment obtainable, yet have a poor defense against fire. Their personnel are not trained to use available equipment. There

are many cases on record where the combination of good equipment and poor training ended in disaster. Like the scarecrow, the mere presence of fire extinguishers is not enough to ward off destruction.

Union Electric has long recognized this fact and has taken steps to remedy it. The company not only provides the finest in fire-fighting equipment but also established a program for training employees in techniques of fire fighting.

During the past 15 years the Union Electric Fire School has graduated more than 8,000 students. It had its origin in a report made in 1939, following a trip by some Union Electric people to the Philadelphia Electric Company.

There they observed a fire school which that company had instituted some years earlier. The report was enthusiastic and expressed the opinion that "similar classes in our company would certainly net beneficial results."

In 1950 this prophetic statement proved true in one of the biggest fires Union Electric ever experienced. A transformer fire raged at one of the company's substations. Burning oil came out of the disconnect box, and flames shot more than 25 ft. above the transformer.

A Union Electric employee responded to the situation with courage. He put into practice everything he had learned at fire school. He tackled the fire with four large-size hand extinguishers. He put out the



fire at considerable personal risk. As a result of his heroic performance, the fire was confined to only a portion of one transformer and was brought under control without a power outage or without risk to fire fighters unfamiliar with the high-voltage equipment involved.

For such outstanding action in the face of danger, this employee received the Claude L. Matthews Valor Award. There have been other instances when the training received at the company fire school paid off.

Just as first-aid training makes people more safety conscious, teaching people fire-fighting techniques makes them more fire prevention-conscious. The training received

gives a protection in depth, a readiness in reserve to meet and overcome potential disaster. This confidence has a subtle influence on employee morale. They feel competent to combat fire, if the occasion should arise.

The company provided them with the opportunity to learn. To illustrate how well they have learned, many employees have successfully put out fires in their homes. Their training paid off.

The fire school, staffed by company safety personnel, operates three days a week between May and September of each year. Training is practical. Dressed in overalls and safety hats, and gas masks when fumes are toxic, amateur fire-

men combat and put out a series of fires started on the premises.

Prior to actual fire fighting, students receive classroom instruction on the subject. They are instructed in the types of fires and extinguishing agents effective in their control. They are shown the various types of extinguishers and are taught their characteristics and proper use. Questions and discussion are encouraged.

Students make a dry run in fire fighting techniques. They learn about tools they will use. In the second half of the course the practical applications of these tools are stressed. Here the men actually fight live fires. These range from

—To page 66



Various extinguishing agents are demonstrated. Here dry chemical is used on a flammable liquid fire.



The applicator pipe provides a heat shield for employees extinguishing a flammable liquid blaze.

Employees are shown how a water spray installation quickly quenches a transformer oil fire.

WHEN YOU GOUGE more than 7 million cu. yds. of excavation, chiefly rock, from a gorge wall for a generating plant, you've got rugged rock-fall problems. When another 2½ million cu. yds. of excavation have to be removed for the plant's 1,000-ft-long forebay, the safety task is immense. And when this plant is one segment of a tremendously larger operation, difficulties in rock-fall and other safety obstacles become monumental.

But Niagara Power Project safety engineers faced these hazards three years ago at the start of the activity and, with a minimum number of mishaps, look forward to providing commercial power by February 10, 1961, through what is considered the western world's largest hydroelectric development.

Three reasons dominate this success: organized planning by men who know their jobs; engineering efficiency; and availability and use of safety equipment that can meet hazard head-on without coming off second best.

The generating plant, the responsibility of Merritt-Chapman & Scott, in the main powerhouse construction area, is fairly typical of safety problems met at Niagara. This structure is designed as a semi-outdoor plant 1,840 ft. long, 580 ft. wide, and 389 ft. high from the lowest point of foundation to the top of the intake deck.

Working three shifts a day, the firm employed an average work force of 1,566 men per day earlier this year at this facility. The total has sometimes been more than 2,000 men.

Huston W. "Doc" Fuller is in charge of safety here for M-C&S. "The job is high," he says. "We have people above people. We try to keep as scattered as possible, but to promote efficiency, there are times when it's necessary to have people below each other. We've constructed barricades and use nets to catch rolling material, but head protection is still a must!"

And M-C&S, one of the project's major contractors, sees that each of its employees gets aluminum alloy hard hats and caps.

"We've never had a major fall," Fuller says, "but head protection has proved valuable in scaling and

In the gigantic Niagara Power Project, where men and materials must be moved over men and materials, good planning, safe operation, and sound equipment prevent accidents

there's Power in Protection



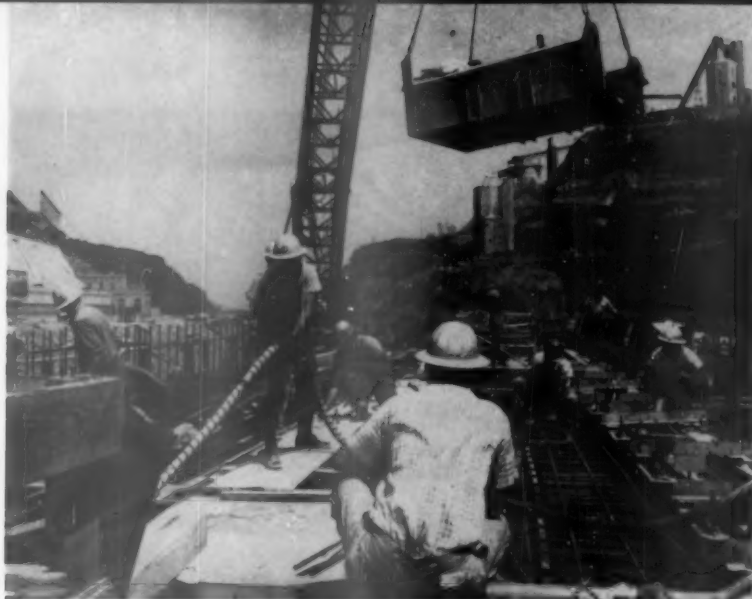
In the turbine-generator section of the Niagara Power Project's plant area, workmen prepare to position a column form for concrete placement. Hard hats are a must.

shaft work where we've had trouble with raveling rock [small sections of rock that loosen and fall from gouged earth surfaces].

"Men in the penstock slots [which will carry water from plant intake to the turbine-generator section] have been hit by falling rock that weathered out. Our hats saved these boys from severe head cuts, if not cracked skulls."

Head protection is just one phase of the M-C&S over-all safety program. A comprehensive safety approach begins with a new man on the job. He receives a booklet containing general safety rules and is urged to make a daily habit of reading the publication.

Covering personnel safety, tools and equipment, rigging and handling, and general data, the booklet



Left, men work cautiously under men and materials that must be moved overhead. Lightweight hard hats and caps are standard items of dress.

Below, this necessary operation involves construction men getting ready to fasten a tremie chute to a 4-cu.-yd. concrete bucket used to place concrete in the Niagara generating plant penstock area.

points out: "A safety program must be a continuous day-to-day activity. It must be planned and organized, and must have the interest and participation of every individual involved. The planning must be executed to provide maximum safety of lives and property."

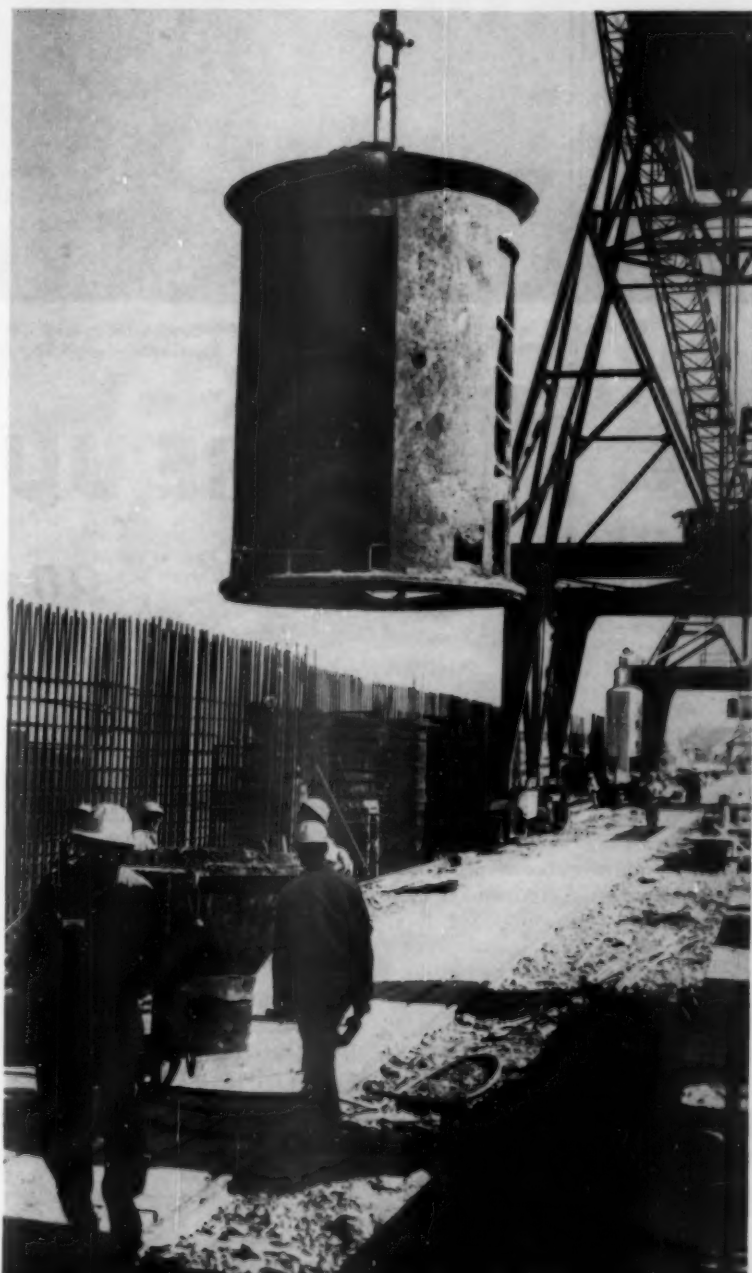
These and other points come up for discussion at weekly 15-minute *tool box meetings*. Each foreman schedules the meeting time for his crew in any period between Monday and Saturday. He files a report of the meeting—subjects discussed and safety suggestions from the group—with the safety engineer, who completes the report by recording any action taken.

Safety Engineer Fuller also conducts weekly foremen's safety meetings "at any time of the day or night." Sessions last from 20 to 40 minutes, during which there is a review of accidents, accident prevention, and safety equipment such as head protection, safety belts, respirators, oxygen breathing apparatus, hydrogen sulphide detectors, and other items.

"Doc" also issues periodic *field memos* on general safety precautions. One result is that, working closely with Uhl, Hall & Rich—general engineering firm on the project—the M-C&S safety mark has been better than average in the construction industry.

For example, in May 1960 accident frequency dropped to a rate of 17.3, down 20 per cent from the average figure for the previous 12-month period. The severity rate

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Potential forest fire starters? Incandescent sparks from diesel exhaust form eerie pattern on time exposure photograph at dusk.

GETTING THE JUMP

By NORVAL BURCH

on forest fires

PRESERVATION of the nation's forests is a matter of vital concern to millions of Americans who follow the shady trails each year in quest of recreation.

Sharing their concern are millions more who are conscious of the immeasurable contribution of this vast natural treasure to the living needs of the nation.

Is it any wonder, then, that we Americans, almost to a man, will hang on every headline and every newscast—with dread, yet with hope—as the story of a forest fire unfolds? "Did the new control lines hold?" "Was that village evacuated

in time?" "Have the fire fighters suffered more casualties?"

Whether caused by lightning, by a carelessly tossed match or by glowing carbon particles from a motor exhaust, forest fires are recognized as a dire threat to our country, and they bring America instantly to attention—to watch and to hope.

So, there are few groups of national heroes supported by such an ardent cheering section as the men who fight our forest fires. And a certain glamor has surrounded the forest rangers who patrol the woodland trails and man the fire towers

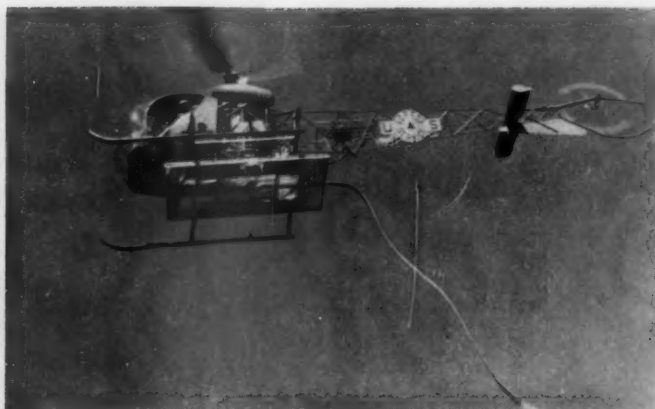
—to keep a constant watch for the first sign of smoke in 181 million acres of national forests.

Back of this exciting area of activity, however, the U. S. Forest Service has a more prosaic, though no less vital job. In fact, the problems faced and the decisions to be made are much like those of any big business. In the case of this big business, the goal is the conservation and wise use of vast resources for the greatest good of the whole people.

Among the major business operations, there is timber management for balanced growth and sustained



"Helljumper" suit protects forest fire fighter in jump landing through trees at scene of blaze.



Precious minutes can be saved laying fire hose in forest by helicopter (above), so special hose tray (below) is designed to unload accurately.

yield—that reaches us, through contract sale to private enterprise, as lumber to build and furnish our homes.

Range management involves the studied control and leasing of vast grazing lands to stockmen whose livestock may help feed us.

Perhaps none of the functions of the Forest Service is more vital than watershed management—that fights erosion to protect the forests that assure steady flow to the sparkling streams that bring life-giving water to farms and cities far below.

With all this broad range of activity, there must be engineering. There are roads and trails to be built, streams to be diverted, soils to be stabilized, and thousands of other engineering functions.

One of these involves a little known but vital unit devoted to a special phase of the safety effort—the development of equipment that will meet the special needs and stand up under the gruelling re-

—To page 116

Special spark trap cabinet is built around manifold from two engines (top) with Gill spark arrester undergoing cold exhaust test from blowers underneath.

Engineer Charles Howard (below), test designer, watches test instruments that record manifold pressure, back pressure, oil and water temperature and other factors in rigid test of spark arresters.



Safety Behind the Bars

In one of 30 federal penal and correctional institutions, Lewisburg officials believe inmates have the right to work in safety

By F. J. FITZPATRICK

Safety Director, U.S. Penitentiary,
Lewisburg, Pa.

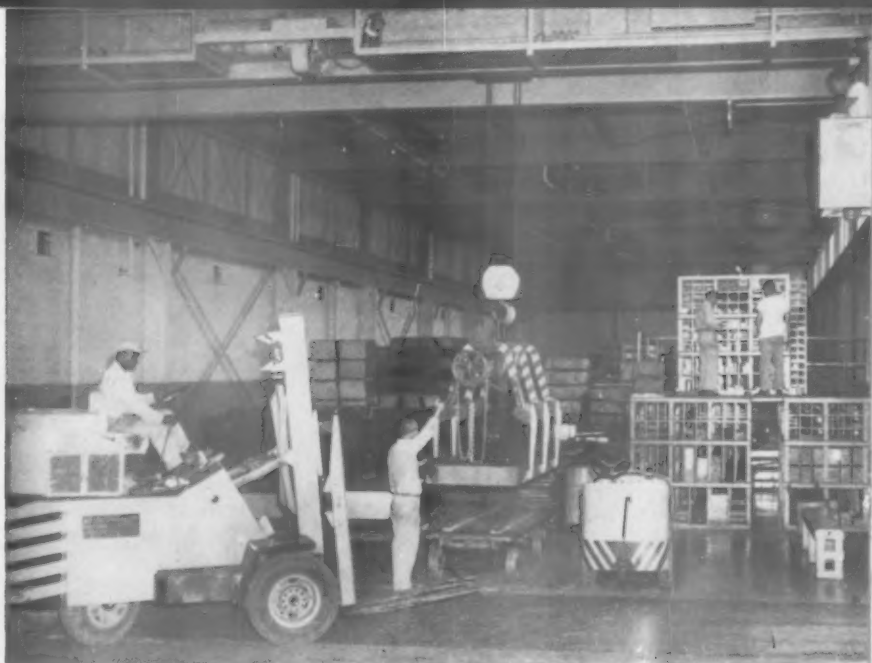
VIOLATIONS of law by inmates of penal institutions don't exclude them from the right to work in areas free of hazard.

Goals of accident prevention in prison are no different, of course, than they are in an outside plant, but teaching safe practices is a bit more difficult in a penitentiary.

Prisons have no power of selection. They must take whatever the courts send in the way of manpower, and the rate of turnover is approximately 50 per cent per year. Seventy per cent of the people employed in these industrial operations have no experience and can be described as "wholly unskilled."

Twenty-five per cent might be "semi-skilled," because they may have held short-term jobs at one time or another. And only five per cent or fewer have had some type of training in a trade. To overcome such handicaps, the training and indoctrination in safety of these men must begin early and continue throughout the entire period of confinement.

The U.S. Penitentiary at Lewisburg is one of three high-walled, federal penitentiaries with large industrial programs in operation. This unit manufactures steel cabinets, clothing lockers, shelving, boxes, cups, bowl, and food trays. And a small part of the plant makes pants, coveralls, and doctors' coats.



Above: Modern steel handling operations require safety marking, good housekeeping.

Below: Safety gloves and warning signs offer safeguards in shearing steel to size.



Federal Prison Industries, Inc., (see opposite page), employs approximately 450 men of a total penal population of 1,700 at Lewisburg. Although every man entering the prison is oriented in safety, those in industrial operations receive a more intensified indoctrination.

Here, the inmate's introduction

to the safety program begins in the first week or two of his arrival. At this time, I or my assistant go to the Administration-Orientation Unit, where the newcomer is confined for the first 30 days, and talk to new groups.

They are advised of the many types of operations conducted

throughout the institution, informed on hazards involved in these activities, and told how to overcome these obstacles. We also describe industrial operations here and the existing safety program.

They are told of compensation law set up to protect them in the industrial operation and what these laws mean to them.

We suggest they pay strict attention to foremen in charge of any department to which they might be assigned.

After the initial 30 days of orientation, the Classification Committee assigns newcomers to jobs and quarters. Those chosen to work in Industries are selected on a basis of family, personal, or institutional

need, in that order of importance.

When these men arrive at the plant, they receive further indoctrination in safety. First, they must study and memorize a set of general safety rules. They also are asked to complete an experience sheet, covering prior work history.

Then I deliver a comprehensive talk on safety aspects of Lewisburg industrial activities, using what is often referred to as a "gruesome board."

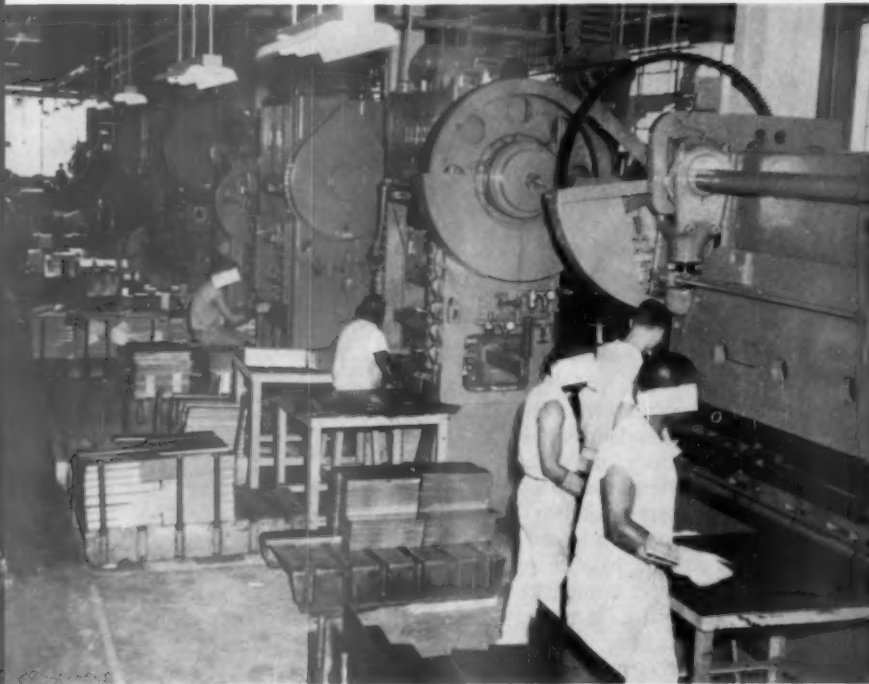
This board carries pictures of past accident victims and shows vividly the results of such mishaps. The picture story on the loss of four fingers from the left hand of an inmate usually gets full attention. Climax of this case history is the display of a jar containing four human fingers preserved in formaldehyde.

We also give accounts to inmates concerning use of eye protective equipment and other such gear that has prevented serious injury in the past. The entire talk is aimed at gaining voluntary adherence to safety rules simply because it is the sensible thing to do.

Men are warned that safety rules will be enforced strictly. We believe, if these inmates are sufficiently impressed in this initial indoctrination period, foremen in departments will have less difficulty in obtaining compliance with safety rules and use of protective equipment.

Sharp edges of sheet steel have caused the greatest number of injuries at Lewisburg, and the more serious accidents have occurred on power shears, brakes, and presses for forming metal.

During war years, car loads of sheet steel were unloaded by hand, piece by piece at Lewisburg, but



Above: Brake and press work make good lighting and housekeeping necessary.

Below: Goggles and gloves have saved many an inmate from spot-welding burns.



Federal Prison Industries, Inc.

Lewisburg's industrial activities are operated by Federal Prison Industries, Inc., for the Federal Bureau of Prisons. FPI is a wholly-owned government corporation, created by Congress in 1934 and charged with providing employment for physically fit inmates of U.S. penal and correctional institutions. FPI establishes only those industries which will produce products for use of the federal government. None of these commodities are sold in open market in competition with private industry.

many cuts on hands, arms, and bodies resulted.

Now, Lewisburg has a new steel warehouse department equipped with a 10-ton bridge crane that handles complete bundles of steel with comparative safety for all. Most antiquated power equipment has been replaced with modern machinery designed for maximum safety and guarded against known dangers.

Vacuum and magnetic sheet lifters, air ejection and fence guards at Lewisburg keep operators' hands out of danger areas. Consequently, this federal prison can boast it has not had a true amputation since January 1955.

Leather gloves, arm guards, and studded aprons have reduced minor cuts to a minimum. The number of foot and toe injuries is gradually lowering through introduction of a new safety shoe program.

During 1950 a strict eye protection program in the Assembly Department, where frequent spot-welding accidents occurred, has produced freedom from serious eye injury since that campaign.

The industrial operation has a



Above: "Gruesome board" shows amputation photos. Below is jar containing fingers.

permanent safety committee, consisting of the superintendent of the Metal Furniture Factory, the chief of the Millwright Department, my assistant, and me.

Three foremen, chosen on a rotating basis, make up the balance of the seven-man safety committee here, and all committee members make regular inspections of the plant at least once a month. By choosing foremen on a rotating basis for one-month service periods on the committee, all employees keep up-to-date on activities of this organization—considered vital to efficient industrial operation.

On June 30, the end of the past fiscal year, the severity rate at Lewisburg was 160; the frequency rate was 22. The relatively high frequency rate is explainable, since Lewisburg registers as disabling

minor cuts and bruises not considered disabling in outside industrial operations.

As on outside operations, the prison accepts charges for time absent from work due to accidental injury starting after the shift or day during which the accident occurred.

Industrial wages here range from 12 to 30 cents per hour. Inmates obviously are not as inclined to refuse a day off as men in free society, who reject such treatment because it would mean loss of a great deal more money, needed in most cases to support a family.

Despite our accomplishments, we feel there's still much to do here in accident prevention. Lewisburg will continue to improve, because prisoners are people. As people, they're entitled to all of the benefits of a sound safety program.



Frank J. Fitzpatrick—in the Federal Prison Service for 25 years—has supervised fire prevention and safety at Lewisburg since '43. He is past chairman of the Capital District Federal Safety Council in Pennsylvania and an associate member of ASSE.

Below: Lewisburg Penitentiary has 1,700 inmates of whom 450 do industrial work.



AROUND THE COMPASS



ACTIVITIES

• PROGRAMS

• EVENTS

Traffic Law Overhaul Urged in Minnesota

The Motor Vehicle and Traffic Laws Study Committee of the Minnesota Safety Council has recommended 25 revisions in Minnesota's laws. Proposals include periodic inspection of motor vehicles, absolute speed limits, re-examination of drivers on license renewal, implied consent for chemical tests, and recodification of motor-vehicle registration laws.

Other changes and improvements proposed by the Study Committee relate to driver's licenses, arrests, enforcement jurisdiction, and driver education programs. Most of these recommendations conform to provisions of the Uniform Vehicle Code, or—as in implied consent for chemical tests—they agree with proposed revisions of the code under consideration by the National Committee on Uniform Traffic Laws and Ordinances.

Traffic Speeds Up Yearly in Wisconsin

Average vehicle speeds on Wisconsin state highways have been increasing at the rate of almost one-half mile per hour per year for the past 15 years, according to the annual speed study published by the State Highway Commission of Wisconsin.

The 1960 speed check shows the average speed of vehicles on intrastate highways has been 53.9 mph. this year. A review of figures for the past 15 years on rural highways remaining in the same condition indicates there has been an average annual increase of .44 mph.

Fifteen per cent of the vehicles were traveling more than 62.8 mph on intrastate routes. On interstate

highways it was found the average speed was 60 mph, and 15 per cent were exceeding 68.6 mph.

The average speed of heavy trucks was found to be 46.7 mph—in excess of the statutory maximum limit of 45 mph for heavy trucks. Fifteen per cent were traveling in excess of 53 mph.

Among home-based Wisconsin passenger cars, more than 12 per cent were traveling at speeds in excess of the daytime limit of 65 mph.

Green Bay Police Trail Emergency Cars

Dissatisfied with poor compliance of motorists in yielding right-of-way to ambulances, police, and fire department vehicles, Capt. J. R. Sloan, of the Green Bay, Wis., Police Department has announced a plan to detect offenders. Whenever a motorized policeman is available, he will be dispatched along the same route as a "trailer" behind emergency vehicles. Any violators of the safety code will be arrested promptly.

Omaha Holds Occupational Safety Conferences

Omaha Safety Council opened its first series of occupational safety conferences September 7 with a session featuring Gen. Henry Hoefler, assistant general manager, National Safety Council, as speaker.

The second session October 5 presented Dr. Earle S. Hannaford, safety engineer, American Telephone & Telegraph Company. A third session November 3 featured F. B. Lewis, manager safety and courtesy, Union Pacific Railroad.

More than 500 employees have been registered by their companies. Six sessions meet simultaneously for

one hour before the speaker is introduced to a general session. Sections are Construction, Food Processing, Motor Vehicle, Public Utilities, and Shop Practices. A section on the subject of Women for women in industry and employee auxiliary groups emphasized the woman's angle.

A looseleaf directory, "Training Aids Index," has been prepared by the Omaha Safety Council for mailing to top business leaders. Flip charts, films, and demonstrator models of equipment available for showing are listed under the major divisions of the safety field. Key numbers with each item show the source where it may be obtained.

200 Entertainers To Promote Safety

Through the Greater Los Angeles Chapter, the National Safety Council will present 200 entertainers with safety messages on 2,000 radio disk jockey programs in months ahead. Performers are donating time and talent worth many thousands of dollars.

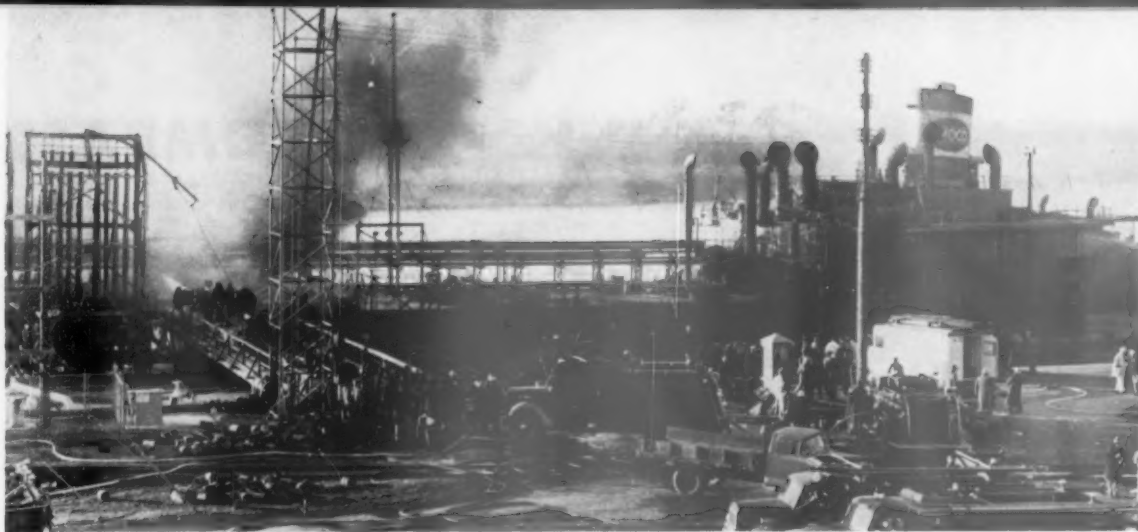
"Idaho Traffic Truths"

Idaho Traffic Truths is a booklet on Idaho traffic accident statistics. It is published by the Traffic Safety Division, Department of Law Enforcement, Idaho.

ASSE, Baton Rouge Talk On-Job Safety

An On-the-Job Safety Conference convened September 20 under sponsorship of the Greater Baton Rouge (La.) Safety Council and Greater Baton Rouge Chapter of

—To page 129



Well-coordinated, equipped and alert, this disaster aid group was ready for the 20-hour inferno when the "Virginia" burned

the Blaze Busters

THIS MONTH is the first anniversary of a 20-hour inferno that took the lives of eight, injured 25 others and caused great property damage to a tanker at a loading dock in Texas. This is how it happened:

12:30 a. m.—Flames break out on water of channel near SS "Amoco Virginia," taking on 135,000 barrels of gasoline and fuel oils. Barges

alongside the "Virginia" go up in blaze, which jumps to the tanker. Emergency radio alerts Disaster Aid Group.

4 a. m.—First request broadcast for additional fire-fighting equipment and manpower. Explosion showers steel fragments on surrounding area, threatening dozens of full storage tanks. New crews converge.

Between 4 and 7:45 a. m.—Second explosion shakes 540-ft. "Virginia." More than 500 firemen fight the inferno. Planeloads of Foamite flown in from nearby airfields.

7:45 a. m.—Fire appears under control. Third explosion rips open ship's seams. Fire rages on.

12:45 p. m.—Fourth blast shoots flames 100 yards into air, pushes blaze toward 80,000 gals. of gasoline in ship's bow sections. Heat and shock waves from explosion threaten dozen fuel storage tanks, but tanks hold.

More than 500 men and their equipment took part in busting this blaze, which involved at least four explosions and was fought for more than 20 exhausting hours.





These registered nurses represent the firms participating in this mutual aid program. They mobilize in time of trouble to speed up caring for the injured.



Two-way radios in private cars enable leaders of group to relay information.

8:30 p. m.—Flames from “Virginia” subside to 12-ft. height. Shortly after, fire burns out, and the disaster fighters begin to mop-up.

The event also underscores the blaze-busting effectiveness of an alert, well-trained fire-fighting organization, the Houston Ship Channel Industries Disaster Aid Group.

The readiness of this group was at its peak during the fire, for just two days previously a practice drill had been held at the Diamond Alkali Corporation plant nearby. This coordinated activity tuned up the 500-man group for the fire.

As a result, the radio-alerted components of the group were able to muster and quickly send in first-aid technicians, communications and administrative personnel, civil defense, and volunteer fire departments which competently battled the blaze.

These photographs show the practice session at Diamond Alkali. In communications, the daily radio drills, once each shift the year around, assure equipment is in order at all times.

First aid technicians here pick up fine points in caring for the in-

jured before and during transport to medical stations. Registered nurses speed the efficiency of this process.

Nearby communities provide CD vehicles, fire trucks and even private autos, outfitted with two-way radios, for such emergencies. These radios are effective in relaying instructions to information centers established in time of trouble.

The Houston Ship Channel Industries Disaster Aid Group was originally started in 1955 as a mutual aid body to give assistance to a stricken plant, when requested.

Daily radio drills once each shift assure equipment is in order at all times.



Volunteer first aid technicians practice carrying an injured man to an ambulance prior to seeing that he gets to one of the various medical aid stations established.



IDEAS THAT WORKED

Devices and Ideas to Help
Your Safety Program

By Arthur S. Kelly, Industrial Department, NSC

SAFETY

GRPS. 1 2 3

OPERATIONS	1660	1258	312
MAINTENANCE	730	151	130
TECHNICAL	1486	ELECTRICAL	1250
STEAM-PLANT	618	TOWNSITE	458
CHEMICAL-PL'T	701	AUTOMOTIVE	529
SHIPPING	1244	MARINE	165
WOODYARD	56	SPECIAL SER.	107
ACCOUNTING	1336	SECURITY	508
HOTEL	408	STORES	2889

Last lost time..
ACCIDENT

11 AUG 37
WOODWARD
HELP?
FRACTURED (COMPOUND)
& RIGHT LEG :

NO. THIS
0
MONTH
NO. TH
10
YEA

56 ACCIDENT FREE DAYS

Cartoon for caution

CARTOONS give this sign its punch. Gordon Dyer, designer-builder of this device, cartoons each local mishap and posts it under "Last Lost Time Accident." It's left up until the next accident oc-

curs or 30 days without mishap.

If the latter, the Green Cross for Safety flag is hoisted to the top of a pole on the sign and left there until a disabling injury happens.

Submitted by H. F. Parker, safety supervisor, Marathon Corporation of Canada, Ltd.

WINNER

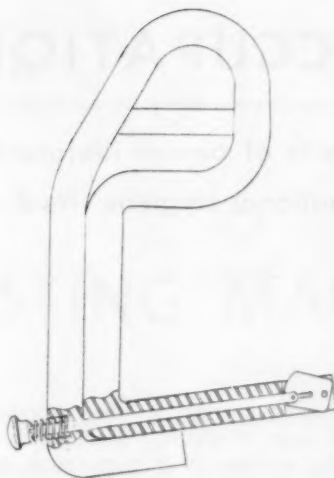
October prizewinner was "World Series." Each day of month worked without disabling injury advances baserunner toward score. Submitted by R. Cosgrove, Dominion Tar & Chemical Co., Montreal, Que., Can.

Lift blankety-blank

▼ **SAFE HANDLING** of greater blanks is almost guaranteed by this special-purpose lifting device.

Developed at the Tulsa plant of Bethlehem Steel Company, this basic idea could be modified for jobs which—because of shape, size, or weight—present special handling problems.

The cross-section at right shows how to make the hook. The illustration beneath the cross-section demonstrates the hook in action.



Hold down axe-ident

AXES carried by skidding "cat" ▶ and "dozer" operators usually can be found lying loose on the deck of the machine. Those tools are seldom sharp.

Welders at J. Neils Lumber Company, Libby, Mont., designed and installed guards and holders which remove both of these problems.

This holder is made of 3/16-in. strap iron welded to the cab guard. A retaining ring, to hold the handle upright, is also welded to the tractor.

Submitted by Franklin A. Mills, Neils safety engineer.



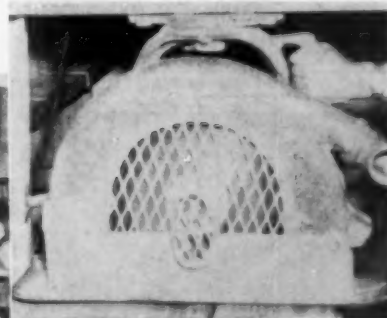
THE SKIRT GUARD for this ▶ saw is low enough to minimize the exposed portion of the saw blade in conventional cutting, ripping a board, or with a jig for cutting wedges. Once the saw rips into the wood, none of the blade is exposed.

Incidentally, it's accepted that left-handed sawing is the safest, and this saw has been rigged so it can be pulled across the stock by the left hand, meanwhile allowing the right hand to hold the stock in position.

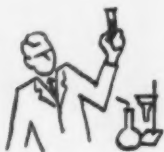
Bill Sapp, foreman of the Packing and Loading Department, U.S. Gypsum Co., New Orleans, La., developed the skirt guard.

This idea has been submitted by R. A. Koy, the firm's personnel superintendent.

Skirts too high?



OCCUPATIONAL HEALTH



Abstracts of current literature on Occupational Hygiene, Medicine, and Nursing

By J. T. SIEDLECKI

Industrial Hygienist, NSC

Skin Decontamination

"Decontamination of Human Skin Experimentally Soiled by Radioactive Materials." By J. S. Felton, M.D. and C. J. Rozas, M.S. *Archives of Environmental Health*. Vol. 1, No. 2. August 1960. Pp. 87-95.

THE AUTHORS have found that among numerous products used for decontaminating skin soiled by radioactive materials are plain water used as an irrigant, soap and water, potassium permanganate in crystalline form and solution, citric acid crystals, kitchen scouring powders, a soapless spray detergent, a sodium bicarbonate alone or mixed with powdered or granulated industrial cleansers, synthetic detergents, sodium hexametaphosphate and a chelating agent (Versene).

Waterless hand cleansers have also probably been used for this purpose. The authors investigated the efficiency of a series of cleansers of the granular and waterless variety, plus slurry and a special cream, in decontamination of radioactivity in skin utilizing a laboratory soil, the radioactive isotopes of I^{131} and P^{32} .

Granulated skin cleanser was

found superior to the waterless cleanser in affecting contamination. The amount of contamination removed was essentially 100 per cent. Waterless hand cleansers will remove approximately 97 to 98 per cent of the contamination. Silicone and lanolin lotions don't offer significant correction.

Colorimetric Gas Detecting

"Air Flow Calibration of Direct Reading Colorimetric Gas Detecting Devices." By H. L. Kusnetz, M.S. *American Industrial Hygiene Association Journal*. Vol. 21, No. 4, August 1960. Pp. 340-341.

THERE ARE on the market several detector kits for testing for a variety of gases. These give rapid and more or less accurate estimates of concentrations of air-borne gas and vapor contaminants.

The pump used to remove air through an indicator tube may be a bellows device, a cylinder to which has been fitted a piston, or a squeeze bulb. Accuracy of these air-moving devices has been frequently questioned.

The author of this paper indicates the necessity of checking carefully the air flow characteristics of these gas-detecting devices. He describes the construction of a simple buret using a soap bubble as a detecting medium to check air flows. The entire assembly is simple. It could be made part of the field equipment.

Hose Air Flow Resistance

"Air Flow Resistance of Flexible Metal Hose." By M. W. First, Sc.D. N. F. J. Viles, Jr., M. S. *American Industrial Hygiene Association Journal*. Vol. 21, No. 4, August 1960. Pp. 296-299.

FLEXIBLE METAL hose of galvanized or stainless steel construction has been used widely in han-

dling solvents, corrosive chemicals, or pyrophoric metal such as magnesium, uranium and zirconium.

Reliable data on friction losses on straight runs and elbows of the flexible metal hose have not been available from manufacturers or other sources. It was felt the air flow resistance of flexible metal hose was identical to that of spiral, wirebound flexible cloth hose.

The authors measured air hose resistance of 4, 5, and 6-in. ID round flexible metal hose and have found friction losses somewhat less than those of standard round galvanized sheet ducts and less than one-half of equal sizes of commonly used fabric-type flexible hoses.

Radiation Safety Primer

"Instructor's Handbook, Radiation Safety Primer." By F. L. Brannigan, Safety and Fire Protection Branch, U. S. Atomic Energy Commission, Washington, D. C.

THIS IS the instructor's handbook to use with the *Radiation Safety Primer* (second revision revised). With the help of this handbook, the *Primer* and slides, the instructor can teach radiation safety to personnel in the simplest possible language without any radiation background.

The approach to the subject of radiation safety by the author is entirely different from that usually presented. The use of technical terminology is omitted from the presentation, and yet the student does learn the fundamental concepts of radiation hazards, what is done to protect individuals from them, and what a person must do to protect himself.

The handbook is recommended to those engaged in teaching radiation safety in plants having radiation hazards.



DIE CASTING MACHINES

*Copies of this data sheet will be
available for order within 30 days*

Introduction

1. The modern die casting machine has evolved from the centuries-old method of casting by pouring molten metal into sand molds which could not be reused. There are numerous types and designs of these machines, and castings can be made in a wide range of sizes and shapes. Every die casting machine includes the dies, activating equipment which opens and closes the dies, and the injection or front end of the machine, which forces molten metal into the dies under extreme pressure. Most machines today are electric-hydraulic controlled.

2. There are three different types of metal injection systems: the plunger, the cold chamber, and the direct air. In the plunger type, the metal is forced into the dies by means of a plunger and cylinder immersed in molten metal. The cold chamber type differs from the plunger type only in that the injection plunger and cylinder are not submerged in the molten metal and the metal is poured into the cylinder by hand ladle. The cold chamber machine produces excellent results with higher melting alloys, such as aluminum and magnesium alloys. In the air injection method, the metal is displaced or forced into the dies by means of compressed air. All three types of metal injection systems are in use today. The air injection method is the least efficient and is rapidly becoming obsolete.

3. Even though die casting ma-

This data sheet is one of a series published by the National Safety Council, reflecting experience from many sources. Not every acceptable safety procedure in the field is necessarily included. This data sheet should not be confused with American Standard Safety codes, federal laws, insurance requirements, state laws, rules and regulations, or municipal ordinances.

chines vary in type and size, their hazards are essentially similar, and methods of accident prevention apply generally. This data sheet, therefore, discusses the problems involved in layout, guarding, operation, and maintenance of most die casting machines.

4. Safety is extremely important in die casting because of the numbers and types of operations and hazards involved. Strict adherence to the rules of safe practice is essential if accidents are to be kept to a minimum and health hazards are to be eliminated.

Department Layout

5. Many accidents can be prevented by careful planning well in advance of the installation of machines and related service facilities. If the movements of the operator are reduced, the fatigue factor is minimized and so also are the chances of injury.

6. Belt conveyors eliminate many materials handling hazards. Properly designed conveyors provide a safe, economical method for mov-

ing the castings from the machines to the trim presses and also for returning sprues, defective castings, and trim refuse to the metal melting furnaces.

7. Enough space should be provided around the machines to allow for unobstructed die setting, machine repair, and quick movements by the operator in event of a splash shot. Flooring around machines should be in good condition and free from stumbling and slipping hazards.

Personal Protective Equipment

8. Operators of furnaces, ladles, and die casting machines and other persons in the immediate area should wear protective equipment, such as face shields over safety glasses with side shields, head covering, canvas aprons, canvas gloves with tight-fitting gauntlets, sleeves, and high safety shoes (Figure 1).



Figure 1. A ladle operator wearing safety glasses, face shield, head covering, and gauntlet-type gloves. (Courtesy Brown-Lipe-Chapin Division, General Motors Corp.)

Pig Storage

9. Metal pigs should be stored indoors on skids and kept dry. Wet pigs, when placed in the melting furnace, can be a source of explosions, fires, and serious burns to personnel. In cold weather, it is desirable to preheat pigs before they are used, in order to dry condensation. To prevent foot injuries from falling pigs, racks for holding pigs should be supplied at the machine.

Furnaces

10. Many types of furnaces are in use, for example, the cast iron pot, the brick-lined open hearth, the tilting furnace, and the electric induction furnace. Every furnace should be enclosed with sheet metal or brick and should be serviced through doors or shields.

11. The cast iron pot is generally discharged by means of a bent pipe siphon. This pipe should always be preheated before it is used to ensure that there is no moisture inside.

12. The hydraulically controlled tilting furnace discharges molten metal directly into the bull ladle. Thus the hazards of the tap hole, common to the open hearth type of furnace are eliminated. The tilting furnace should be loaded from one end with the aid of a skip hoist. An alarm should sound when the furnace is tilted to alert personnel in the area and warn the operator against accidental pouring of metal.

13. The mixing furnace should be equipped with long-handled ladles and skimmers suspended from an overhead chain at a pivot point on the handle. Ladles and skimmers should be preheated before being introduced into molten metal. Flux should not be permitted to accumulate on ladles or tools. Workmen should be instructed to introduce the ladle slowly and sideways into the metal.

Bull Ladles

14. Supplying the die-casting machine with molten metal is a dangerous operation unless certain precautions are taken. Whenever possible, an overhead hoist should be used to transport the molten metal from the furnace to the machine. If trucks are used, they should be equipped with catch pans located



Figure 2. Bull ladle with a safety connection to hoist block. (Courtesy Guide Lamp Division, General Motors Corp.)

under the ladles to prevent burns from hot metal splashes that may occur when the trucks move over uneven spots in the floor.

15. Under no circumstances should hot metal be carried over the heads of workmen. A bell that rings continuously and a flashing light are effective warning devices to alert personnel while the bull ladle is moving.

16. Most bull ladles are essentially the same in design and operation. Secure suspension and positive control of movement are among the requisites of design for ladles and their related parts. An added measure of safety in ladle suspension was the objective of one industrial concern in designing and constructing the auxiliary attachment shown in Figure 2. The arrangement consists of a flange that is welded to the yoke of the ladle after a washer-like shape is inserted under the flange. The washer is connected to a harness on the hoist block by means of hooks. This arrangement is designed to prevent an accident in the event of failure of the lower block, hook, or its connections.

Electric Wiring

17. The electric wiring on die casting machines should conform to a standard operating pattern and to the provisions of the *National Electrical Code*.^{*} Two sets of controls are required, one for automatic operation and the other for manual operation. Automatic operation is initiated by a starting switch and is then carried out in sequence through timers, limit switches, and solenoid controls. Manual controls consist of individual push buttons for opening and closing the machine and for making shots. Manual controls are essential for die setups, repairs, and sample part runs.

18. Heat, vibration, shock, and spills of hot metal will have a damaging effect on sensitive electrical switches, relays, and wiring. Therefore, electrical equipment should be selected with care and should be installed where such exposures will be at a minimum.

^{*}Standard No. 70, National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass. Also published by National Board of Fire Underwriters, 85 John Street, New York 7, N.Y.

19. An electrical control panel should be installed as a separate unit on each machine, in accordance with the recommendations of the Joint Industry Committee on Electrical Standards. All master controls should be in this panel. The master switch should be so equipped that it can be locked in an "off" position before personnel make any entry into the die travel area.

20. A limit switch should be mounted on the shot piston rod of hot chamber machines so that the die-opening circuit is inoperative when the rod is in its forward or shooting position. This arrangement will ensure that the dies cannot be opened while the shot piston is under pressure and will thus prevent hazardous splashes.

21. A control switch that energizes the machine simply by closing

a sliding guard door is desirable. The door can be designed not only to set the machine in motion, but also to remain locked in place while the shot is being made (Figure 3).

22. A two-hand tripping control is another device designed to safeguard the operator, although it does not afford the same measure of protection as the interlocked sliding door. The two-hand device usually consists of two buttons, wired in series, and located and spaced far enough apart so that the operator has to have both hands away from pinch points at the time he trips the machine. The buttons are connected so that they must be operated simultaneously, rather than in sequence, and must be held to start the cycle. They should be arranged so that it is impossible to block, hold, or tie down one button. Pro-

vision should be made so that the operator stands out of line of any splash from between the dies.

Piping

23. Because of its flexibility, steel tubing and fittings equipped with ferrules should be used instead of pipe for die casting machine systems. If pipe must be used, it is better to bend and weld it rather than to use threaded fittings for connections. This method helps to prevent oil or water leaks, thereby reducing both fire and slipping hazards.

24. Pipes and fittings which have a safe carrying capacity for the pressure used should be carefully selected. High-pressure piping should be installed in accordance with specifications set forth in the applicable section of American Standard B31.1, *Code for Pressure Piping*.*

Safety Valves

25. Each individual system must be supplied with a separate pressure relief valve conforming to ASME** requirements and adjusted to open at a pressure approximately 10 per cent above the maximum operating pressure. The valve will then ensure against rupture in a system caused by an unexpected increase in pressure. Only qualified personnel should install, adjust, and set hydraulic safety and control valves.

26. For additional pressure above that available from plant air lines, nitrogen is introduced through the top of the tank. Oxygen must never be used because oil ignites with explosive violence on contact with high pressure oxygen. A qualified engineer should always be consulted before this type of installation is made.

27. On zinc molding machines, an electrically operated valve which closes automatically when the pump is stopped should be installed as a safety valve. This valve prevents the nitrogen from causing the shot cylinder piston to drift down and permit a flow of metal through the nozzle in the stationary die. This is

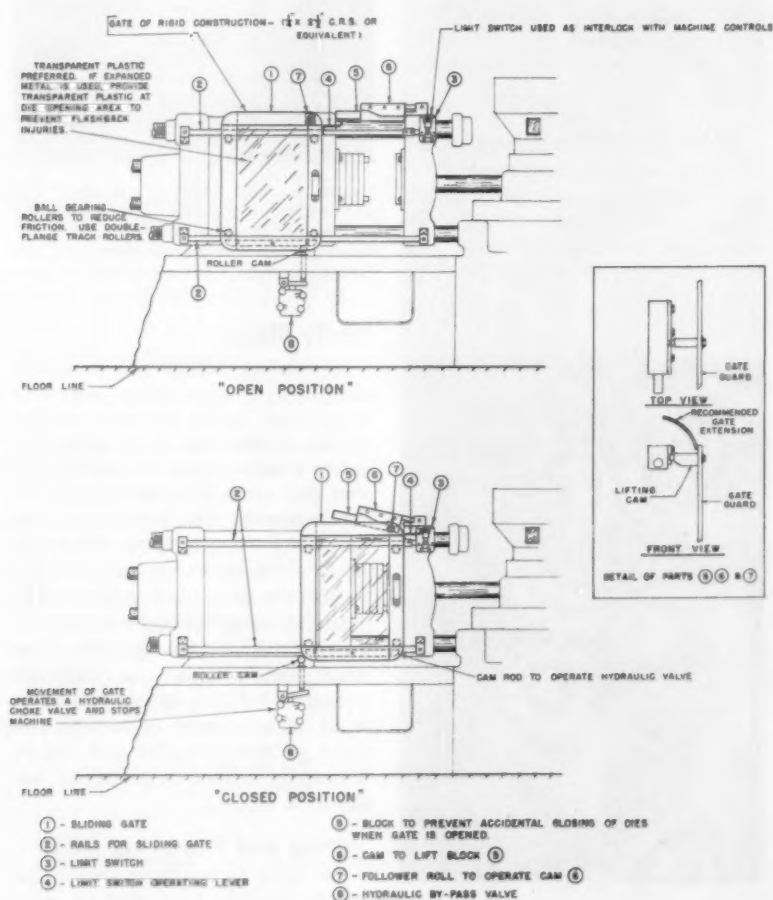


Figure 3. Design of metal splash guarding door that . . . upon closing . . . raises safety block, protects against pinch points and metal splashes, and trips control switch to energize machine. (Courtesy Liberty Mutual Insurance Co.)

*American Standards Association, 10 East 40th Street, New York 16, N.Y.

**American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y.

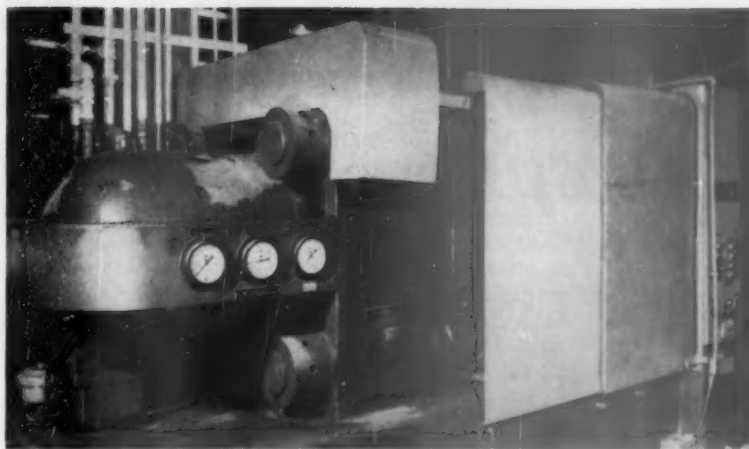


Figure 4. Die casting machine with metal splash guard that covers casting operation completely and actuates machine when closed. (Courtesy Western Electric Co.)

an added precaution when dies are being adjusted, repaired, or set up.

Fire Protection

28. Fire-resistant hydraulic fluids should be used in the hydraulic systems of die-casting machines to reduce the fire hazard in the event of a rupture. Many serious fires have occurred when a hydraulic line ruptured and spewed flammable oils toward the melting pot. Portable fire-fighting equipment, such as dry chemical or carbon dioxide extinguishers, should be located near each machine and should be readily accessible to the operator. The operator and other nearby personnel should be thoroughly instructed in the proper use of these extinguishers.

Metal Splash Guarding

29. Inasmuch as heat and vibration have an adverse effect on the electrical controls, the die casting machine can malfunction without warning, exposing the operator to pinch points and to serious burns from hot dies and ejected metal. Regardless of production volume, whether high or low, all die casting machines should be carefully guarded. A sheet metal door should completely cover the front of the machine and the dies, and the door should be so installed that only when it is closed can the machine be energized.

30. Figure 4 illustrates a die casting machine equipped with a telescoping sheet metal guard which

completely encloses pinch points and protects personnel from splashes of molten metal during the shot operation. This guard has an electrical contact which makes it necessary for the guard to be closed before the dies will close and actuate a shot.

31. Each hot chamber pot should be completely enclosed with sheet metal and should be equipped with a metal chute so that molten metal can easily be poured from a bull ladle into the pot (Figure 5). This

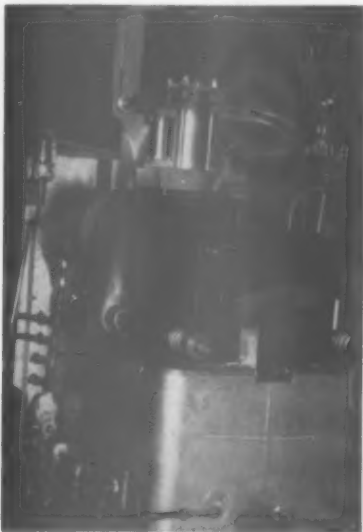


Figure 5. Melting pot with sheet metal enclosure and metal chute. (Courtesy Guide Lamp Division, General Motors Corp.)

sheet metal enclosure protects the molten metal from contact with moisture or flammable oils, which could cause an explosion or a flash fire.

32. Figure 6 shows a removable door with a stainless steel curtain extending down into the molten metal and over the front of the hot chamber plunger and cylinder. This curtain confines molten metal splashes ejected by plunger action when the metal level gets too low. The curtain confines metal should the nozzle fail and allows more pouring freedom when larger-than-average bull ladles are used.



Figure 6. Hot chamber melting pot showing stainless steel curtain attached to bottom of removable door and extending down into molten metal. (Courtesy Guide Lamp Division, General Motors Corp.)

Safety Blocks

33. Safety blocks are necessary safeguards in die casting operations to prevent injury through sudden closing of the dies. In all cases, the safety blocks should be installed so that they are positioned between the dies when the ram is retracted and the safety door is open. When the safety door closes, preparatory for a shot, the door must automatically push the safety block from between the dies so that the dies can close when the machine is energized (Figure 2). Safety blocks should be made of aluminum or similar material so that the dies will not be damaged in the event of an unexpected closing.

Setting and Removing Dies

34. Risk to workmen setting dies can be reduced by use of an overhead hoist and proper tools and by well-trained, conscientious supervision. The hoist should be of a

type that can be raised and lowered slowly and accurately to ensure proper alignment and control. Hoist controls should be so designed that the die setter can be a safe distance away from the suspended load while he is operating the hoist.

35. Whenever possible, permanent die lifting attachments should be fabricated into the dies or die blocks. Otherwise, lifting fixtures or eyebolts must be used.

36. Eyebolts must be screwed into the dies a safe distance. Use of shoulder variety eyebolts can promote safety in this respect. Such bolts should be screwed down tightly against their shoulders to reduce stress on their threaded sections during straight, and especially angular, pulls. In all cases, an eyebolt should be threaded into the bolt hole a distance at least one and one-half times the bolt diameter. The eyebolt should be checked before use to be certain that the threads, shank, and eye are not distorted or damaged.

37. Handling of heavy dies requires careful planning. Often, ejector pin devices and water connections leave no bearing surface that will permit positioning of a die on a die wagon unless the platen connection surfaces are down. In this case, quarter turning of the die in mid-air becomes a necessary procedure. It can be accomplished by one of two methods.

38. The load simply can be transferred from one hoist to another which utilizes the second hook-up point, or a die turning device (Figure 7) can be used. The cam-like action of the base of the turning device prevents the die from reaching a point that would result in flop-over. In other words, the weight of the die remains on the hoist at all times, whether the hoist is lifting or lowering, except while the die is in a reclining position or has the support legs in place.

39. To set a die casting die, this procedure should be followed:

- a. Lock the power control in "off" position.
- b. Screw the eyebolt into the die and clean the platens.
- c. Lift the die into the machine.
- d. Loosen the rear carriage tie bar nuts and back them off if necessary.

- e. If design of the machine requires this step, insert the ejector pinion through the ejector mechanism and into the die.
- f. Bolt and clamp the cover half of the die first, then the ejector half.
- g. Adjust the tie bar nuts so that pressure is even on all corners of the die and the toggle links can still be locked in position.
- h. Connect the water pipes to the die; turn on electric power; close the machine; put the nozzle in, heat, and then tighten the nozzle tie bolts.
- i. Try out the machine to see if it locks at the proper pressure.

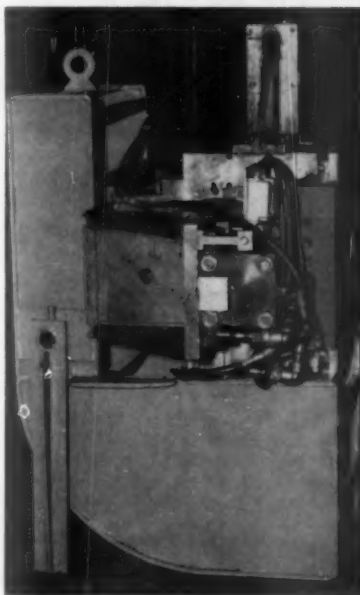


Figure 7. Ninety-degree die turning fixture with swivel-type legs. (Courtesy Guide Lamp Division, General Motors Corp.)

- j. Open the machine and shut off the power. Connect the water lines, and check for water leakage.
- k. Install the ejector pinion and cam.
- l. When a hand ejector is used, be sure that the ejector pinion and handle are set so that the handle cannot strike the operator if he should forget to return the ejector plate before closing the machine.
- m. Open and close the machine to be sure that the ejector is working properly.
- n. Open the machine, close it part way, and put in the torch. Shut off the power while the die is heating.
- o. When the die has reached the proper temperature, remove the torch, close the machine, and shut off the power.

- p. Install the piston.
- q. Make a trial shot with the bottle pressure valve opened slightly.
- r. Continue making trial shots until the machine is ready for production.
- s. Some makes of die casting machines require a final check to make certain that the die close piston crosshead is correctly set up before the final lockup.

40. The recommended sequence in removing a die from a die casting machine is as follows:

- a. Close the die and lock the power control in "off" position.
- b. Loosen the nuts on the tie bar.
- c. Remove the shot piston or install a safety bridge.
- d. Remove the ejector pinion.
- e. Remove the water lines.
- f. Loosen the nozzle clamping bolts.
- g. Pull the carriage away from the furnace and remove the nozzle.
- h. Attach a chain fall (or sling) to the eyebolt, after making certain that the eyebolt is screwed in securely and that the lift will not overload it.
- i. Remove the bolts.
- j. Turn the power "on" and open the machine.
- k. Turn and lock the power "off" and lift the die from the machine.
- l. Lower the die to the die truck or floor and remove the eyebolt. The die should be accompanied by the trim and the shots on the gate.

Die Storage

41. Because of the weight and value of dies, adequate handling and storage facilities should be provided. Often dies weigh several thousand pounds. A strongly built rack with roller shelves slanted towards the back will help to make die handling both efficient and safe. An elevating platform truck will also reduce the danger of injury when dies are being moved to and from the rack.

Maintenance

42. Proper maintenance of casting machines is especially important because of the extremely high pressures required in their operation. All working parts are under severe strain, and fractures are not uncommon. Therefore, the operator must keep all parts of the machine under surveillance so that weaknesses, such as oil, water, or air leaks, broken toggle pins or arms, loose clamps or bolts, can be

reported and repaired immediately. Preventive maintenance—continuing inspection and prompt repair—is the best assurance against serious failure of equipment and injuries that can result from it.

Ventilation

43. To ensure good ventilation, die-casting machines should be located in a building with a high roof, preferably of the saw-tooth or monitor type. The smoke and heat created by operation of the machines will thus be more readily dissipated. Fresh air brought into the workroom by means of fans and ducts, as well as removal of contaminants by local exhaust hoods, will improve working and health conditions. For example, the formation of zinc oxide fumes can be prevented by maintaining a molten metal temperature below 1,000F. General ventilation or local exhaust or both can be used to remove such fumes as may be formed in the melting and casting process. If an operator must stack hot castings near his machine, some means should be provided to exhaust the heat.

Lighting

44. Good lighting is essential to good operation. The dies must be clearly visible to the operator if he is to see that they are free of small pieces of flash which may prevent them from fully closing and thus cause metal to be ejected. A recommended practice is to install adjustable spotlights overhead to one side of the machine in such a way as to

illuminate the dies without causing glare.

45. Oil and smoke make it difficult to keep lighting fixtures clean when they are installed close to the machine. Thus fixtures should be located to minimize such soiling, consistent with their placement to afford ample illumination.

Machine Operation

46. Dies should be used only on machines that have ample capacity to handle the operation safely and efficiently. No machine should ever be overloaded in an attempt to produce parts that require more pressure than the machine can deliver.

47. No operator should ever be permitted to place his hands or arms in the working area between the dies while the machine is ener-

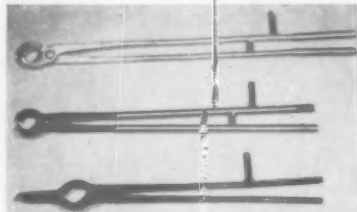


Figure 8. Tongs with pins on handles to define safe gripping position. (Courtesy Delco-Remy Division, General Motors Corp.)

gized. Longhandled aluminum tongs should be used to remove castings. The tong handles can be equipped with pins which define the limit for safe gripping, and operators should be trained not to place their hands beyond these stops (Figure 8). A

longhandled offset brush should be used for lubricating dies and for clearing them of flash. This lubricant is usually highly flammable, and great care must be exercised to ensure that this material does not come in contact with the melting pot.

48. Die casting dies with supposedly identical cavities seldom operate alike. In addition, each die has its own individual operating characteristics. Both delays in operation and injuries to workmen can be minimized if each operator on an early shift is trained to inform his replacement of operating difficulties, such as sticking parts, drag marks, fired and broken pins.

49. A skilled operator will make certain before each shot that sprues are clear and heated and that the dies are clean. He will also be alert to detect a defective or broken toggle pin or slackening in die closing pressure and will see that correct temperature of the molten metal is maintained.

ACKNOWLEDGMENT

The revision of this data sheet was written by M. R. Franklin, Safety Engineer, Guide Lamp Division of General Motors Corporation. Content has been extensively reviewed by members of the National Safety Council and by representatives of chapters of the American Society of Safety Engineers. The data sheet has been approved for publication by the Publications Committee of the Industrial Conference of the Council.

BERT



Workers in all 50 States now wear
Iron Age

TALL TEXAN

Steel Toe

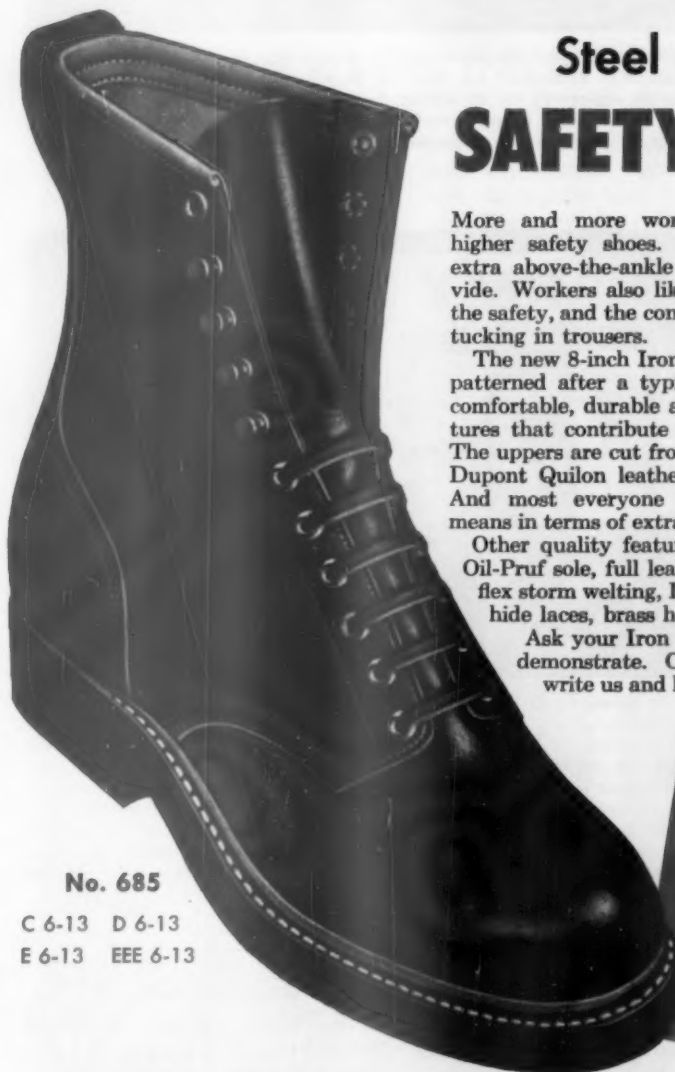
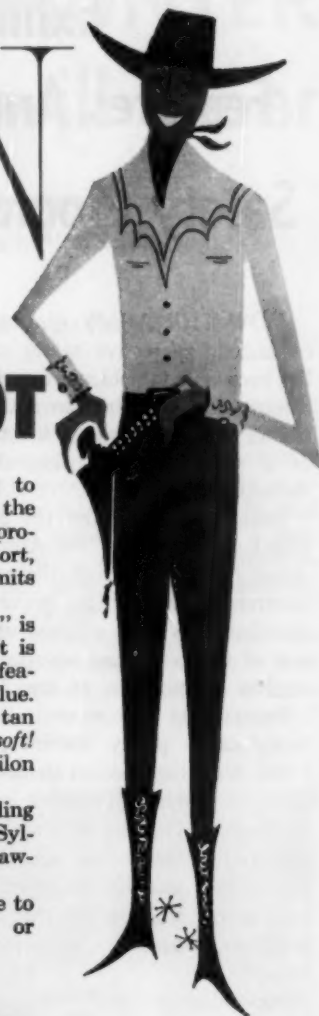
SAFETY BOOT

More and more workers are turning to higher safety shoes. They appreciate the extra above-the-ankle protection they provide. Workers also like the added support, the safety, and the convenience that permits tucking in trousers.

The new 8-inch Iron Age "Tall Texan" is patterned after a typical range boot. It is comfortable, durable and has a host of features that contribute to utility and value. The uppers are cut from genuine golden tan Dupont Quilon leather. *They dry out soft!* And most everyone knows what Quilon means in terms of extra wear.

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for Industrial America*

Iron Age SAFETY SHOES

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PITTSBURGH 12, PA.

Exhibit Features Army Safety Program

HOW THE ARMY, through an organized, aggressive safety effort, has been able to achieve remarkable results in the elimination and control of accidental loss is the theme of a safety exhibit being shown throughout the nation.

Designed to acquaint the public with key elements of the Army accident prevention effort, the exhibit illustrates how accident prevention contributes to more efficient utilization of resources and advances the combat effectiveness of the Army.

Introducing the exhibit is the Army safety policy statement and a film depicting selected elements of safety in training, in combat, and in production. Through the medium of authoramas, the viewer sees examples of how safety is integrated into the rigorous training required to develop and maintain a combat-ready Army.

Next, illustrations depict how certain of the hazardous exposures of combat are minimized through training and the use of personal protective equipment.

Examples are then shown of controls required by the high hazard potential presented in the manufacture, transportation, storage, and employment of weapons, missiles, nuclear components, and other materials comprising the modern day soldier's arsenal of weapons.

Another panel of the exhibit depicts how Army training develops a shield of "safety awareness" for its military and civilian personnel, enabling them to guard against impulsive actions, the tendency to impro-



This exhibit reads: "Combat Protection for the Atomic Age Soldier. Hazards inherent in combat cannot be eliminated but they can be minimized. The Army is supplying the best possible equipment for its soldiers to ensure greater personal safety in his daily tasks as well as on a future battlefield. The items shown here range from devices to detect air contaminants to armored vests."



On the left the exhibit reads: "Army Industrial Safety. The Army recognizes that the safety of its personnel is a primary responsibility. Consequently, its safety program encompasses all phases of Army environment and operations. By providing the safest working conditions possible, enforcing safety rules, promoting employee safety participation, and personalized safety training, the Army has built a reputation for safety that exceeds the safety traditions of civilian industry." At the right under Safety in Production and The Hidden Costs of Accidents the exhibit reads "Direct Cost. Indirect Cost. For every \$1 in direct accident cost there are \$4 in hidden indirect expenses. Like the iceberg, hidden costs of accidents are not visible on the surface but are there just the same."

vises, acts of impatience, and feelings of impunity.

Other sections of the exhibit illustrate the relationship between military and civilian safety personnel, the relationship between direct and indirect costs of accidents, and recognition the Army has received for its success in controlling accidental loss.

The Army has earned the National Safety Council Award of Honor 14 times in the past 16 years and became the only federal agency in the more than 50,000 civilian employee classification to have won the highest safety citation in government a second time by winning the President's Safety Award for 1959.

What the WELL-DRESSED DEER HUNTER will wear

This thorough scientific study, reported here in its entirety, proves that daylight fluorescent orange is the color that will save lives in the woods

By Oscar W. Richards, Ph.D.; Ralph W. Woolner; and Lt. Jack Panjian

WHAT IS the best color to wear so as not to be mistaken for a white-tailed deer? The hunter should wear a bright, conspicuous

OSCAR W. RICHARDS is chief biologist, American Optical Co., Southbridge, Mass.

RALPH W. WOOLNER is audio-visuals supervisor, Information and Education Section, Massachusetts Division of Fisheries and Game, Westboro, Mass.

LT. JACK PANJIAN is an optometrist in the Eye, Ear, Nose, and Throat Clinic, U. S. Army Hospital, Fort Devens, Mass.

color, different from natural objects with any weather, lighting, or terrain, during the legal hunting season. The protective color must also be as visible as possible to color-blind people. The color must not resemble a deer even during poor lighting at the beginning or end of the day. White or near-whites must be avoided. Flashing a white handkerchief has proven hazardous. Last year a hunter was killed early one morning while eating an apple be-

fore there was enough light for good seeing. While hunting is one of the safer sports (on an actual mortality basis), every care should be exercised for safety. An extensive field test has demonstrated that a daylight fluorescent orange provides the best protection for Massachusetts deer hunters.

In Massachusetts, hunters are required to wear red or yellow. Red is traditional; children soon learn that red is a warning of danger. Red



Fluorescent colors tested on this type of target were blaze orange, neon red, fire orange, and arc yellow—also standard reds and yellows.



This disappearing target, painted to simulate the going away view of a deer, was painted in several colors besides the test colors.





Targets were placed on men moving along a marked trail. Observers recorded results as in other tests, and blaze orange was rated best.



Surprise targets were included in the study. When this figure wore yellow, not fluorescent, it drew two shots in mistake for white.

◀ This picture should lay to rest any fears that a buck would be frightened away by fluorescent orange. Author Woolner took this 184-pounder (dressed weight) while wearing the bright vest and cap shown. Deer are thought to be color blind.

clothing is much less visible than red signal lights, and when the lighting is poor, appears dark and may not be seen. People with poor color vision may not see some reds, or confuse reds with greens. Since the greens in nature cannot deliberately be made bluish-green like traffic lights, there can be confusion with red clothing. Red is a poor color for protecting hunters.

Yellow is a bright color, easily visible with good light, but unfortunately a color that turns gray to white when there is little light. When the yellow area is so small that its image covers only the very center of the retina the color is not seen, as that part of the eye is insensitive to yellow. A yellow cap may not be seen at a distance and a yellow vest appears whitish at dusk and at dawn, and can fail the hunter when protection is most needed. Also, yellows may not be seen by a hunter wearing yellow (or amber) shooting glasses.

The deficiencies of the commonly used colors led Woolner to seek the best color for hunter protection. Some five years ago he became interested in the fluorescent colors. Some of these were tried in a preliminary way in the fall of 1958. At the 20-acre test field used the effective sunset was about a half-hour earlier than official sunset because

of hills to the west of the property. Some hunting over-vests were made of red, yellow, and a fluorescent fire orange. These were placed among the bushes near the ground though clearly visible at 30 to 100 yards distance. On a dull day, the red disappeared about five minutes after the effective sunset, the yellow about thirty minutes after, while the fire orange could be seen for an hour after the effective sunset. On a bright, clear day the red disap-

peared at forty minutes, the yellow at fifty-five minutes, and the fluorescent reddish-orange at sixty-five minutes after the sun disappeared behind the hills. For some fifteen minutes after the other colors had lost their visibility as colors, there remained an unnatural glow from the fluorescent red material. The greater visibility of the fluorescent color indicated a need for an extensive experiment to determine the best protective color for hunters

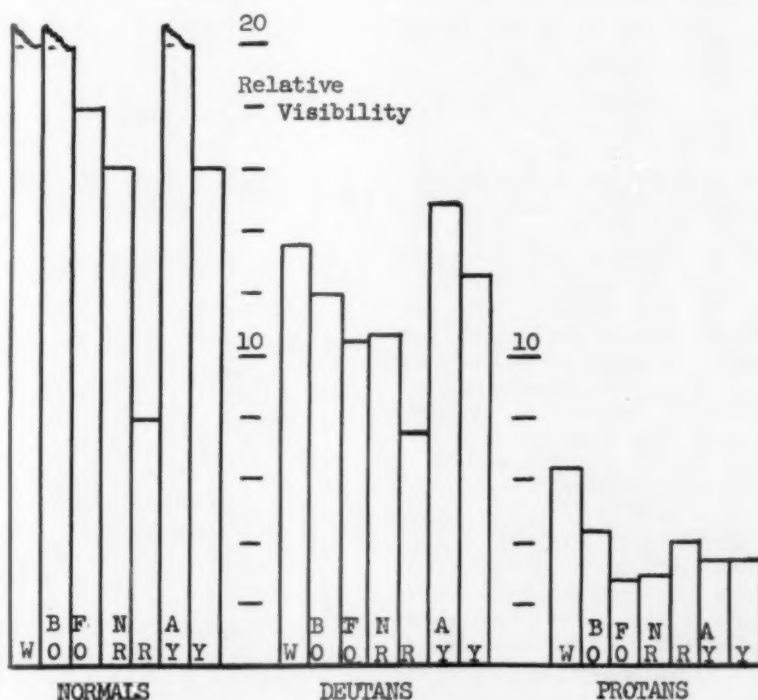


Figure 1. Relative brightness of the colors as seen with a "daylight lamp" for normal and color vision deficient observers.

of white-tailed deer. As this would be a test of use, it should be done in hunting territory. Note that this is *not* the question of what is the most conspicuous color, but rather *what color is least likely to be confused with a white-tailed deer.*

The large area of Fort Devens in north central Massachusetts offered typical deer hunting terrain and the Army personnel cooperated in the field study. The program was supervised by a committee consisting of Col. Louis N. Altshuler, Lt. Col. Hugh M. Rutledge, Maj. Noah King, Capt. Eugene Ritzo, Lt. Ray B. Proffit at the Fort; Mr. Gaylord Pike and Mr. Bryant R. Chaplin of the Massachusetts Divisions of Law Enforcement and of Fisheries and Game; and the authors. More than 500 men of the First and Second Battalions participated as observers, and many more assisted in the field work.

Colors

Since blues are less visible and greens would not be seen well in the woods, neither of these colors were used. Available fluorescent colors Arc Yellow, Blaze Orange, Fire Orange, and Neon Red, and nonfluorescent white, yellow and red materials were made into vests that could be tied on over regular clothing. Table 1 gives the color specifications for the materials used and the relative peaks of the spectrophotometric curves. The yellow cloth was the closest available match to the yellow recommended for hunters by Lehr *et al.* (1959); a good match in hue although less saturated and of lower luminance, Table 1. The triangular front parts of the vest included about 160 square inches and the back area was about 200 square inches. The vests were worn over the regular uniforms of the soldiers, or were mounted on Army silhouette targets, which closely resembled a person.

The color of a material results from the light selectively reflected by it, *e.g.* a red reflects only the red from the white light and absorbs the light of other colors. More light is reflected to the eye by a bright red; a dark red may reflect almost no light. The brightness of a color depends on the amount of light re-

—To page 104

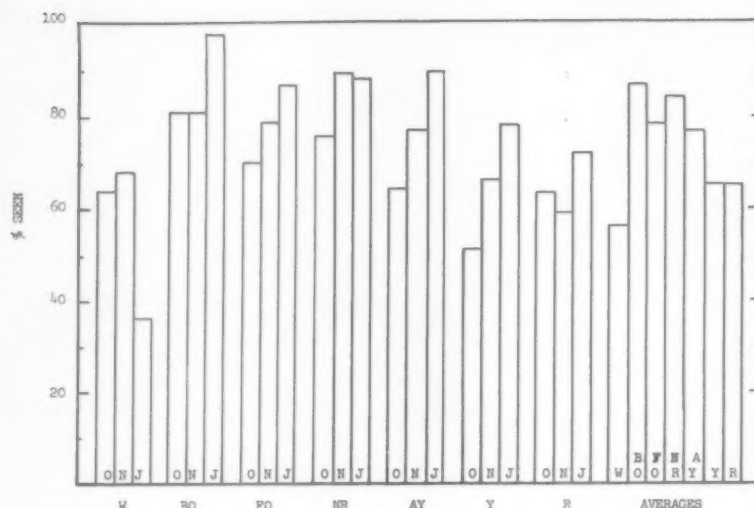


Figure 2. Relative visibility of colors on Course A. (See text for details). W=White, BO=Blaze orange, FO=Fire orange, NR=Neon red, AY=Arc yellow, Y=Yellow, R=Red, O=October, N=November and J=January.

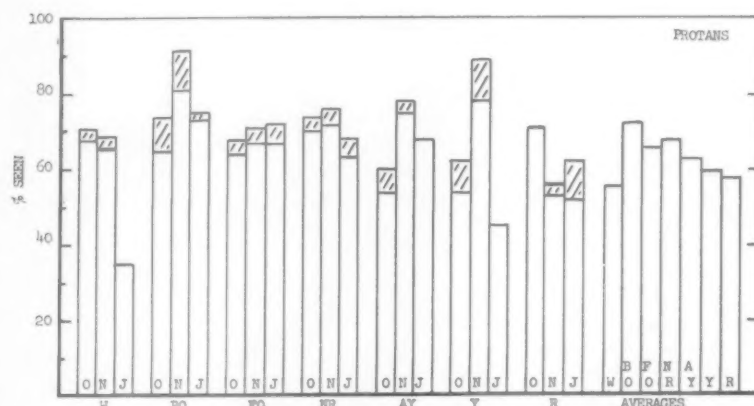


Figure 3A. Summary of the relative visibility of the colors for partial color-blind observers. (Compare with Figure 1.)

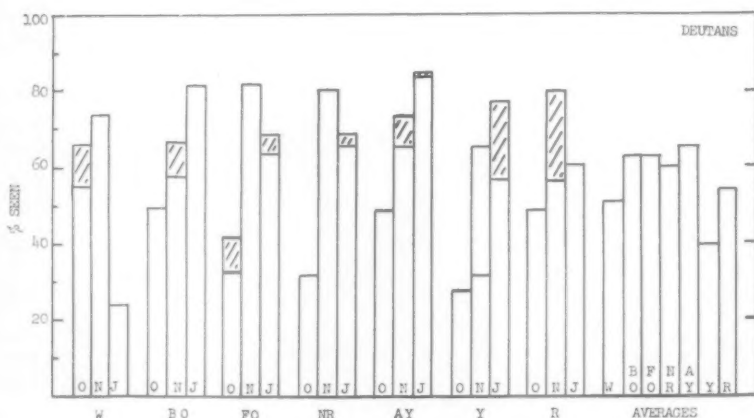


Figure 3B.



STRENGTH



COMFORT



GOOD LOOKS



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"WHEN I CAME TO, other workers were holding me, keeping my hands from my face. Five months later, I was blind. A nothing. From supervisor to nothing's a big step, friend."

Bill Frank, now 45, sat back in his easy chair and sipped a beer. The past 16 years had seemed like 166, but he's on his way back. He'll never see again. An exploding cutoff wheel fixed that. But he's on his way back.

Surviving through woodcraft, made on his power saw, drill and lathe, he's worked 12,500 undistracted, sightless hours without a disabling injury. And he's aiming for a renewed career in industry.

"Any machine set up to run from a jig, a blind man can handle," he says. "I've either done it myself or 'seen' it done with a turret lathe, band saw, drill or punch press."

In '44 he was foreman of a night crew in a small demolition bomb

casing plant. World War II was on. The big thing was production! When a machine broke down or got old, he fixed it up and kept it going... a powder keg with two burning fuses!

One night Bill unknowingly put together his formula for pain and disablement. He was the typical worker... the guy who's 98 per cent safe in mind and job habits... but unsafe for that deadly two per cent.

With faulty attitudes and potential errors in judgment, Bill stood offstage for his own personal tragedy. He took his cue when a younger worker failed to show up at a machine.

If someone didn't supply the shift with needed materials, the plant would have to shut down temporarily. Production would sink. Management would criticize. Whether the machine was makeshift and doing work for which it was unfitted seemed incidental—at the time!

So Bill stepped in front of the unguarded cutoff wheel and started to work. He wore ordinary glasses because goggles provided didn't fit over his own lenses. Within seconds, the wheel overheated.

"I didn't feel a thing. Not a thing. But they told me I had a deep gash from my eyebrow to my chin. My left eye was cut, and there was a goose-egg on my forehead. It occurred to me I'd trained 500 kids never to stand in front of those machines, but I was in a hurry."

The plant didn't have a nurse or even adequate first-aid equipment. Friends took Frank to a nearby doctor and then, for some reason, brought him back to the plant. Bill remembers that workers weren't wearing goggles when he'd been hurt... but when he came back, everyone had them on. And they all had halted production.

He went home for the night, came back to work the next day, and then began extended visits to hospitals and medical consultants which ended a year later with the decision on his eyesight: "No hope."

Bill's left eye had cataracted before his job, but he was able to work efficiently. Now the right eye, retina torn by flying steel, failed and left him blind.

"For a time I studied the organ, made leather belts, did the things a

By BOB DORSETT

BLIND

but NOT helpless



Bill Frank and his guide dog Chinook show you what a blind man can do with power tools, when he sets his mind to it. Aside from several minor burns from getting fingers too close to the turning lathe, Bill's accident record is perfect for 12,500 undistracted, sightless man-hours.

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 Phillips Petroleum
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 Rockwell Steel
 Rockwell Metals
 R. J. Reynolds Tobacco
 Rockwell Oil
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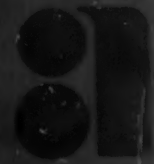
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lot of blind guys do at first. Then I turned back to my trade as a machinist and have been working with power tools ever since.

"I use every bit of safety equipment I can get my hands on—guards, respirator, safety glasses (to keep sawdust chips out of my eyes) and special switches and guides to steer me away from trouble."

If workers or employers used all the safety equipment made available by manufacturers, Bill feels half of the accidents that do happen wouldn't occur.

He carries this a step further with a plexiglas guard that entirely surrounds his wood lathe, when he demonstrates at art fairs and on TV in the Chicago area. "I wonder if I'd cut as thin as I do, if I could see," he says, having worked to within 1/32 of an inch in his most delicate piece of woodcraft—a candy dish.

"Folks ask me how I can work to precision. I use sound. The thinner the cut, the higher the pitch of cutting noise. Along with my other safety gadgets I can always tell where the wood is, and my touch

keeps me accurate during chiseling on the lathe."

Bill has designed his own safeguards: a bandsaw jig that holds the wood in place at any desired radius, a face-plate gimmick that accurately centers wood on the lathe, and on-off knee switches that enable him to work safely without taking his hands off his tools.

"Improvising is more or less a specialty," he says. He's made wooden toys with a special jig, tuned up car engines, and suggested effective production changes at several firms employing the blind locally.

Looking back on his mishap, he can now see it objectively: his faults—hurry-hurry, standing in front of an unguarded, makeshift machine without proper protective equipment; management's faults—not providing the right safety or manufacturing gear and emphasizing production out of perspective. "Partly my boners, partly theirs," he summarizes.

His formula for safety: "Stop and think a second. The company and you will gain in the end. They may



Here Bill works with his drill press. To keep from accidentally starting or stopping it, he has a special switch, upper left.

even raise your pay from savings in workmen's compensation premiums. You'll scratch their back with extra production. And you'll all have your sight."



The

President's Medal

Awards made by the National Safety Council for successful application of artificial respiration

JAMES A. MORONEY, clerk, Peoples Gas Light and Coke Company, Chicago—drowning.

ROBERT D. STIEGHORST, lineman, Central Illinois Light Company, Peoria, Ill.—electric shock.

JAMES O. ADAMS, painter, Gray Roofing Company, Jacksonville, Fla.—drowning.

JAMES A. McDOWELL, operator, Schlumberger Well Surveying Corporation, Effingham, Ill.—asphyxiation.

DAN M. NICHOLS, lineman, Johnson County Electric Cooperative, Cleburn, Tex.—electric shock.

DONALD B. MORTON, test leader, General Electric Company, Glenoklen, Pa.—electric shock.

LESLIE J. SILHAN, pipeliner, The Texas Pipe Line Co., Houston, Tex.—asphyxiation.

WALTER S. MCGREW, JR., maintenance and operation worker, Omaha Public Power District, Omaha, Neb.—electric shock.

JEROME P. MOOTZ, station installer, The Pacific Telephone and Telegraph Company, Lynwood, Calif.—asphyxiation.

CLAIR J. CLEMETSON, contractor, Park River, N.D.—drowning.

JAMES C. GRAHAM, installer-repairman, Indiana Bell Telephone Company, Inc., Indianapolis, Ind.—auto accident victim.

D. L. SMITH, groundman, Electric & Water Utilities Dept., Jacksonville, Fla.—electric shock.

MORRIS C. BATES, service foreman, Lone Star Gas Company, Dallas, Tex.—drowning.

HOWARD W. COOK, crane operator, Union Carbide Metals Company, Niagara Falls, N. Y.—asphyxiation.

CHRISTOPHER D. MCCOOL, electrical engineer, General Electric Company, Electronic Components Div., Owensboro, Ky.—asphyxiation.

MRS. WAYNE SOUTHWORTH, housewife and former employee of Texaco, Inc., Houston Tex.—drowning.

HERBERT L. BAER, supervisor, American Telephone and Telegraph Company, Long Lines Dept., Washington, D. C.—seizure in water.

WILLIAM J. KING, oiler, Kennecott Copper Corporation, Utah Copper Division Mine, Bingham Canyon, Utah—electric shock.

VICTOR CHRISTENSEN, forestry aide, U.S. Forest Service, U.S.D.A., Reserve, N.M.—asphyxiation.

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WAMSUTTA / PACIFIC

INDUSTRIAL FABRICS, 1430 Broadway, New York 18, N. Y.

By BILL ANDREWS



(Fiction)

After a bull session at the Congress where some conflicting ideas on motivation were batted around, our Safety Engineer came home somewhat confused

Who's Right?

November 3, 1960

WHEN I WAS AT the National Safety Congress, I fell into a bull session with several solid professional engineers, men with 20 years or more experience in the field. The talk came around to the question of motivation.

Gorvan was emphatic that fear was the strongest motivation. "Maybe I'm crude," he said, "and maybe I'm old-fashioned. But I think you reach the worker through his animal fear of injury or death. You reach the foreman through his fear that accidents will make him look bad to his boss. You reach the top management man through his fear of losing money or his fear of getting bad public or personnel relations."

Marron—he's just become top safety director of Colossal Motors—smiled tolerantly at Bill Gorvan. "Bill," he said, "I know how you work, and I know you get results. Fear will work. But I don't think a safety man has to create fear. It's there, whether we instill it or not. No, I'm for a more positive approach. I never use a poster with a picture of an injured man. In my experience, most men either don't think a bad accident can hit them, or they are fatalistic about accidents, saying, 'If it's my turn, I'll get it.'"

"I'm using the slogan, 'Safety is smart,' this year. Next year, we'll be hammering on the slogan, 'Safety works.' The year after that, we'll be saying, 'Safety pays.' I don't tell people to worry about trouble. I tell 'em how they can stay out of trouble."

Morgan Sites grinned with all his

three chins and said, "My, such serious boys. My people want to be kidded, so I kid them. 'Here comes old fatso Morgan,' they say, and they laugh at me, and they laugh at my jokes, and I tie my safety teaching to gags. They remember the gags, and so they remember the teaching, and because they like the gags, they follow the teaching."

Williamson of Bronston Steel looked dour. "You men sound like you were figuring the best way to sell soap. I'm an engineer, and I try to find answers to problems, and I tell people the answers when I find them. I suppose sometimes I scare people. I suppose sometimes I stress the positive side. I try to sweeten instruction with a joke sometimes. But the real point is to learn the truth and give it to people."

Dugan shook his head emphatically. "I don't see that—not for the routine of safety work. Sure, we all know there are problems that take analysis and well-calculated corrective action. But mostly we are talking—whether we are talking to worker, supervision, or management—about old truths we know without thinking them through. I don't use a slide rule in my work four times a month. And I don't believe in stock approaches like fear or constructiveness or jokes, either. I play the business by ear—and I haven't been too unsuccessful."

I didn't volunteer any view, but I left that bull session thinking about Dugan's last words. They were true—but they were true for the other men, too. Every one of them had a good record. Every one of them had survived long years of struggle against accidents, had re-

duced accident rates, and built substantial safety departments.

Each of these men described honestly the motivations which he sought to play on. Each was, in fact, describing the role that came easiest to him—which was truest to his own personality.

In the two weeks since I've been home, I've been keeping a mental record of the arguments I hear used by my assistants in the course of their work—and of the arguments I use myself.

I find one of my boys is an emphasize of the fear approach. The other believes, his way of working shows, in a combination of the positive approach with the analytical, engineering method. I don't know which gets the better results. But I know certainly that I would make each of them less effective if I asked him to try to use an opposite appeal.

I wonder, though, about myself. I seem to be an opportunist—pretty nearly a chameleon. I find myself bellowing out scare stories on occasion. You could have heard me a block last week when I talked to that truck driver who came around a blind turn in the Lemmerton yard and just missed six girls leaving the plant.

But later on, talking to the truck line's foreman, I was taking the positive approach. "Look," I found myself saying, "I know what you're up against. These truckers you're getting come out of the hot-rod set, or they're low-grade men who couldn't hold jobs on the long-haul lines. You get a drunk now and then, a goof-off pretty often. But,

—To page 151

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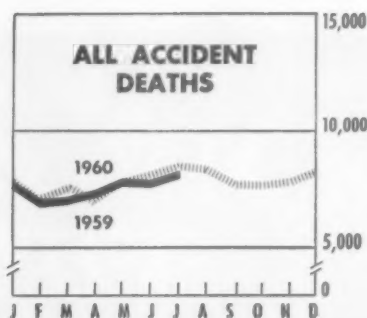


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THE ACCIDENT BAROMETER

Prepared by the Statistics Division
National Safety Council



THE NATIONAL ACCIDENT FATALITY TOLL

	July			Seven Months		
	1960	1959	Change	1960	1959	Change
Total	8,100	8,300	- 2%	52,500	52,300	0%
Motor-Vehicle	3,450	3,250	+ 6%	20,540	20,350	+1%
Public (except M.V.)	1,900	2,100	-10%	9,800	10,000	-2%
Home	1,800	1,950	- 8%	16,000	15,700	+2%
Work	1,200	1,250	- 4%	7,900	8,000	-1%

WORK INJURIES

18 NATIONAL SAFETY COUNCIL CONTESTS

Disabling Injury Frequency Rates

	1960	1959	Change
July	7.41	6.98	+6%
Seven Months	7.44	7.26	+2%

MOTOR-VEHICLE DEATHS

SEVEN MONTHS 1960

CHANGES IN DEATHS

Number of Reporting States

25	UP from 1959
1	SAME as 1959
23	DOWN from 1959

Number of Reporting Cities Over 10,000 Pop.

293
193
234

GREATEST PERCENTAGE IMPROVEMENT IN DEATHS

States

Rhode Island	-32%
New Hampshire	-26%
Nebraska	-25%

Cities Over 200,000 Pop.

Omaha, Neb.	-61%
Worcester, Mass.	-47%
Grand Rapids, Mich.	-44%

HOME AND PUBLIC DEATHS

SEVEN MONTHS 1960

HOME DEATHS

UP from 1959:

Firearms
Fires, burns
Poisonings
Poison gas

DOWN from 1959:
Suffocation

Home

Down	0- 4
Up	5-14
Down	15-24
Up	25-44
Up	45-64
Up	65 & Over

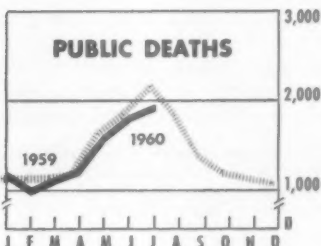
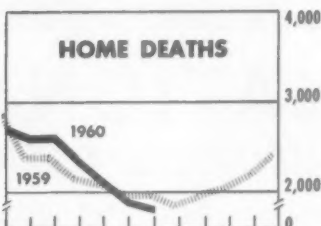
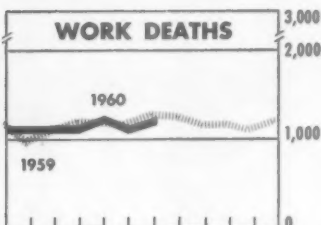
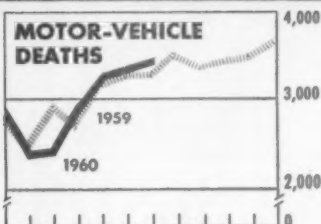
Public

Down
Up
Down
Down
Down
Down

PUBLIC DEATHS

UP from 1959:

DOWN from 1959:
Transportation
Falls
Drownings
Fires, burns





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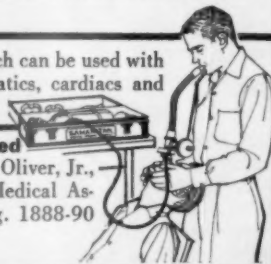
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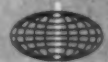
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—From page 56

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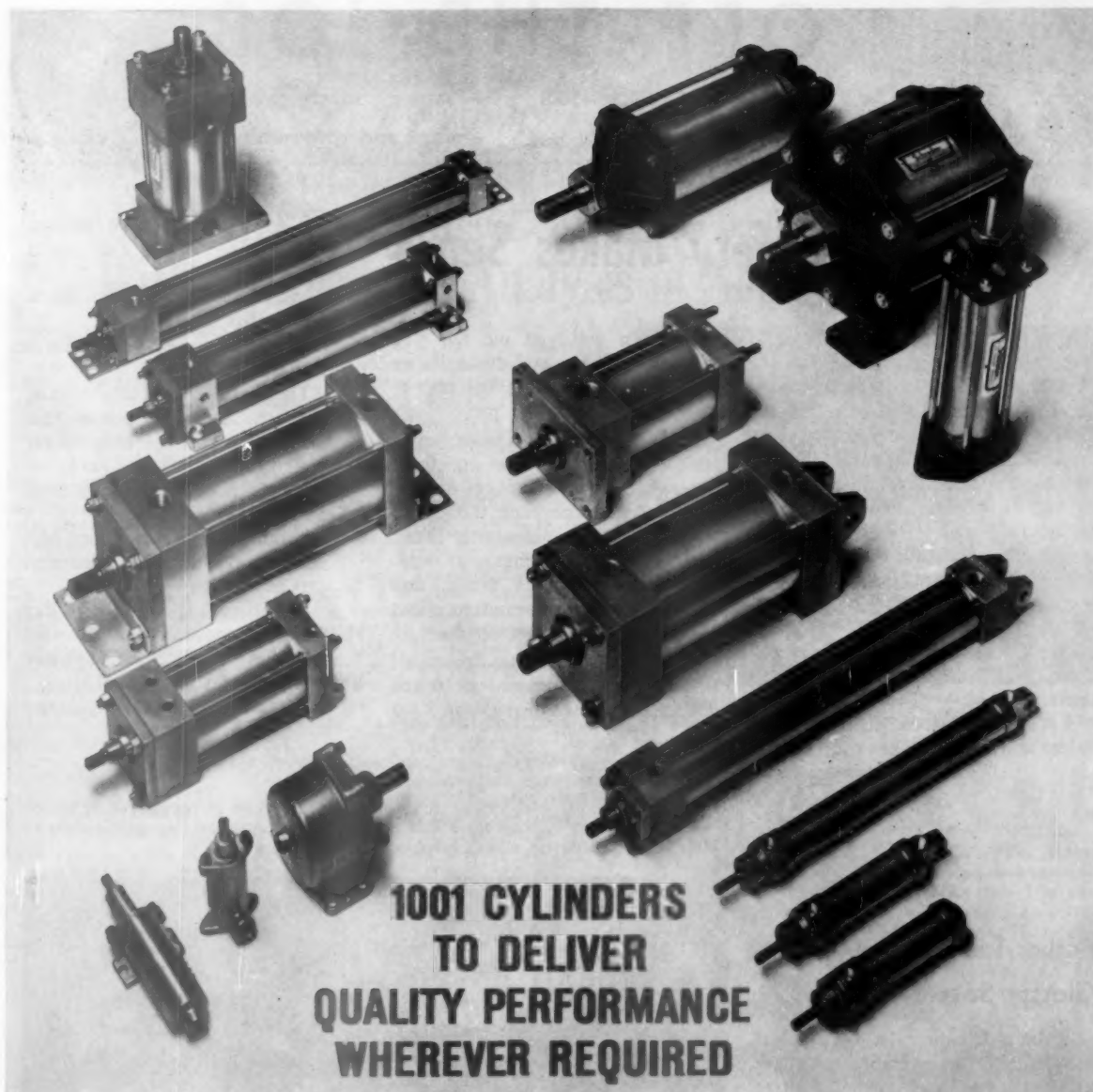
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—To page 139



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OFF THE JOB

By HARRY C. JOHNSON

NSC Staff Representative, OTJ Safety Committee

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Off-Job Safety Makes Sense

One of hundreds of papers presented at the recent Congress—"Off the Job Safety Makes Good Sense"—expressed the thoughts of H. E. Newbury, safety supervisor, Olin Mathieson Chemical Corp., Ecusta Paper Operations, Pisgah Forest, N. C. Mr. Newbury spoke to the Pulp and Paper Section.

We think that, not only does off-job safety make uncommonly good sense, but Mr. Newbury's approach to an effective off-job program makes excellent reading, too. Here, then, is the latter part of his address:

Let's take a look at off-the-job safety and why it makes good sense!

To begin with, let me tell you what we're doing at Ecusta Paper Operations to publicize the importance of safety off the job.

For more than four years we've furnished our supervisors and foremen with three to five pages of supplemental material each month, to assist them in conducting their monthly safety meetings . . . material that carries as much, and sometimes more, information about safety off the job than on the job.

We've sent into the homes of our employees prepared booklets, such as *How to Drown-Proof Your*

Family, and a publication on eye protection, *Only One Pair to a Customer*.

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2. The picture of an automobile, showing the 10 vital points that should be checked for safe operation.
3. Plastic pocket cards on artificial respiration.
4. A bulletin on fire fighting, listing many ways that fires can and do start in the home.
5. A bulletin on gun safety—for children and adults.
6. Copies of our State Highway Point System for traffic violations.

—To page 101

Robert Chapin, 13, and George Riley, district supervisor of safety for American Brake Shoe Company, both agree that this pair of safety glasses saved the sight of Robert's left eye during a rock-breaking job.

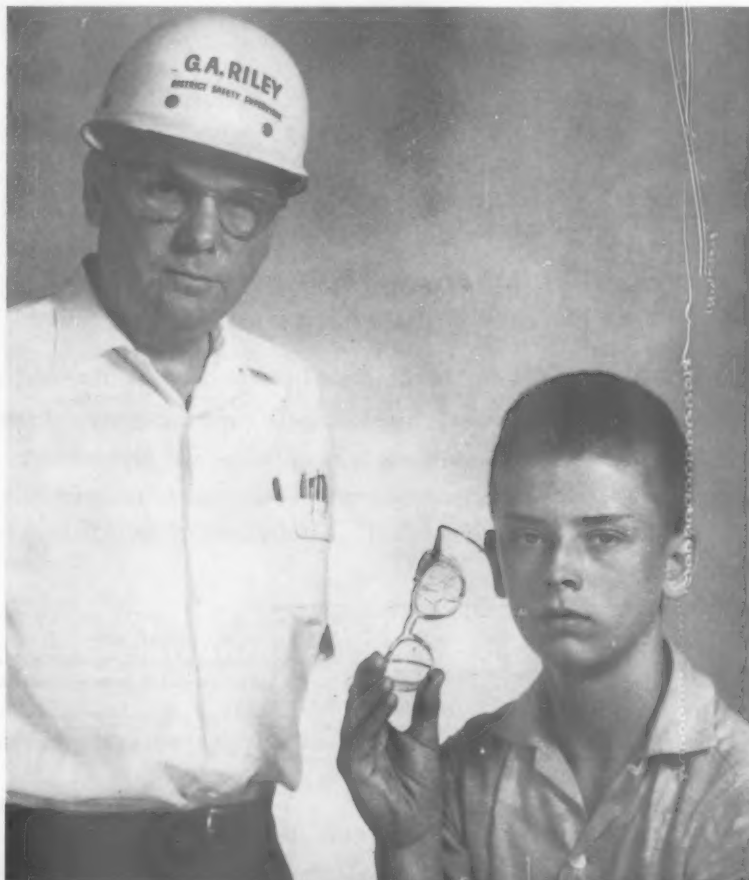
Father Teaches Son— Glasses Save Sight

Robert Chapin, 13, of Ridgewood, N. J., probably can see through his left eye as the result of learning his safety lessons from his father and wearing safety glasses while hammering rock.

The boy's father, Henry, is senior metallurgist at American Brake Shoe Company's Mahwah Research Center. Recently he gave Robert a pair of safety glasses and instructed the boy in their use.

Several weeks ago Robert was helping clear a field. Part of his job was leveling rock. With safety glasses on he hammered away. A good-sized chunk of rock splintered and sent a large chip into the left lens of the glasses, shattering it.

George Riley, the firm's district safety supervisor, said the glasses undoubtedly saved the sight of the boy's left eye.





Sounding Board

News of Interest in the Field of Noise Control

Your Hearing Conservation Program Begins With an Accurate Analysis of Noise-Exposure

Because prolonged exposure to harmful noises cause early-induced hearing loss which is not easily discernible, the accurate analysis of these noises is a vital part of a proper Hearing Conservation Program.

Accurate Sound Analyzer Necessary

The measurement of noise and its analysis, (the breakdown of noise into its various frequencies), calls for precision instruments and techniques. To make the function of noise measurement and analysis easy for non-technicians, the Rudmose Instrument Co. has designed a new combination sound level meter and analyzer which furnishes accurate sound level measurements and octave analysis with a simplicity of operation making it virtually impossible to obtain incorrect readings.

Also Calibrates Audiometers

As hearing tests are the most important part of a hearing conservation program, the audiometer output must be checked routinely for accuracy of calibration. The

Rudmose R.A. #100 Sound Analyzer is equipped with an ear-phone coupler for checking the audiometer's accuracy of calibration. Circle 65.

Audiometers and Audiometric Rooms, Too

The Rudmose R.A. #100 Sound Analyzer is an addition to the equipment distributed by Industrial Acoustics Company, Inc., for instituting a complete and effective Hearing Conservation Program. The Rudmose Automatic Audiometer is available for rapid and accurate hearing tests; and IAC Audiometric Examination Rooms for providing a proper environment for obtaining accurate audiograms. Circle 66.

Control of Noise a Factor

Another important part of any Hearing Conservation Program is the control of noise at its source. This is accomplished by the use of IAC complete or partial noisy machinery enclosures or by protecting personnel with IAC "Quiet Rooms" to shield workers from damaging noise. Circle 67.



Measuring noise level of a machine with the new Rudmose #100 Sound Analyzer. The lightweight, completely transistorized unit is convenient for carrying.



R.A. #100 Sound Analyzer being used to check audiometer. The ear-phone coupler transmits audiometer signals into microphone for checking.

"STEEL CLAD" TELEPHONE BOOTHS KEEP NOISE OUT-CONVERSATION IN



Wall Model "NOISHIELD" Telephone Booth installed in a machine shop.

IAC "NOISHIELD" telephone booths are engineered for high acoustic efficiency to provide ease of conversation in noisy locations or privacy of conversation where desired.

Featuring rugged steel-clad construction, attractive finishes and low cost, these booths are ideal for factories, public buildings, terminals, schools, laboratories, restaurants, stores and for all noisy locations. IAC "NOISHIELD" booths are also available in floor models. Circle 75A.



Using the Rudmose Automatic Audiometer, subject conducts his own hearing test seated within an IAC Audiometric Examination Room.



An IAC machinery enclosure controls noise levels by isolating noisy equipment.

Other literature available:

"Noise-Lock" Doors — Circle 68.
"Quiet" Rooms for Supervisory Personnel — Circle 69.
Control Rooms — Circle 70.
Silencers for Air Handling Systems — Circle 71.

High Intensity Noise Chambers — Circle 72.
"MINI-SIZED" Test Chambers — Circle 73.
Mufflers & Industrial Silencers — Circle 74.
Sound Isolation Rooms — Circle 75.



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Jeffrey Mine of Canadian Johns-Manville sets new world record for nonmetallic mines

General view of Canadian Johns-Manville's properties at Asbestos, Quebec. Foreground: Mill No. 5. Middle: Jeffrey Open Pit Mine. Background: Manufacturing Plant.

LARGEST AND SAFEST

"RECORD MONDIAL—World Record."

In two languages, Canadian Johns-Manville told the world the Jeffrey Mine—the world's largest asbestos mine—had set a new record for nonmetallic mining—2,660,079 man-hours without a disabling injury.

Canadian J. M. had strong competition in winning the safety leadership of the industry. It has been closely followed by the eight other asbestos mining companies near Asbestos and Thetford. Thanks to low accident rates—the result of energetic safety programs, asbestos mining is rated by the Quebec Workmen's Compensation Board and by the insurance companies as *light* industry.

During 11 of the past 12 years, Jeffrey Mine has bettered by a substantial margin the average disabling injury frequency rates for all industry. In addition to several National Safety Council awards, C. J.-M. has been honored by the *Pulp and Paper Magazine of Canada* and the Asphalt Roofing Industry Bureau.

Last May, the C. J.-M. organization celebrated the presentation of the Council's Award of Honor at a

meeting attended by representatives of top management and guests from Canada and the United States. William G. Johnson, general manager of the National Safety Council, presented the Award of Honor to J. O. Eby, Jeffrey mine manager. Jeffrey was the first J-M property to qualify for the Council's top award.

"This award wasn't won by lucky people," says Safety Supervisor Bill Bonneville. "It was won by careful people."

Bonneville's keys to a safe plant are . . . "Inspection, investigation, and training. You have to keep on the move to use them effectively."

Safety organization. Each of the five departments has a safety committee. This group, meeting once a month, is composed of a chairman and members chosen to represent groups of employees. There is also a representative present from each shop committee. Safety recommendations from employees are given to their representatives, who bring them up for discussion at the meetings.

Monthly 10-minute safety meetings, held by every foreman with 10 or more of his men, have been

—To page 143

Adjusting pressure on centrifugal pump lubricating bearings under fiberizers. All warning and instructional signs are in English and French.



W. G. Johnson, general manager, National Safety Council (left), presents the Council's Award of Honor to J. O. Eby, manager of the Jeffrey Mine of Canadian Johns-Manville Company.



During our periodic fire drills at Gillette, a Gamewell fire alarm system has proved itself much faster, much more trouble-free than the one it replaced. We appreciate the excellent protective value of the Gamewell system and

your aid in engineering it to cover all buildings in our plant area.

Howard P. Spaulding
Chief Electrical Engineer
Gillette Safety Razor Co.
Gillette Park, Boston, Mass.



At Gillette it's **GAMEWELL** ... industrial leader installs the leading fire protection system

The Gamewell system endorsed by Engineer Howard Spaulding was carefully designed to protect all lives and property in Gillette's 11 buildings — headquarters of the internationally known manufacturer of razors, blades and other products.

A Gamewell system can be engineered to safeguard your own business from fire losses — including not only irreplaceable human lives but buildings and equipment that can't be renewed at their original costs. It will warn all personnel, signal your local fire department and, if required, will include fire

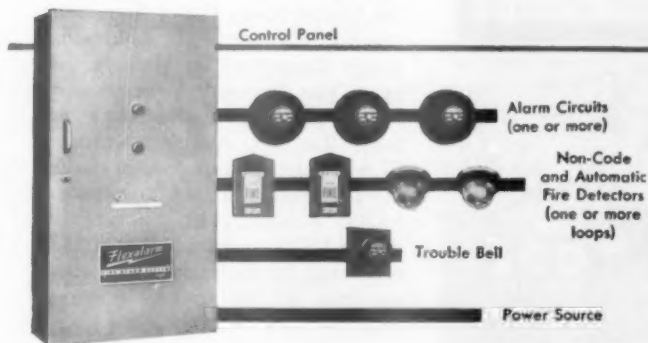
detection units that activate the entire system — instantly — automatically.

Ask your Consulting Engineer about these advantages. Also, a Gamewell Fire Protection Engineer will be glad to give you details about installation requirements, performance and price. Send the coupon below for this service and/or a Gamewell technical manual — without obligation.

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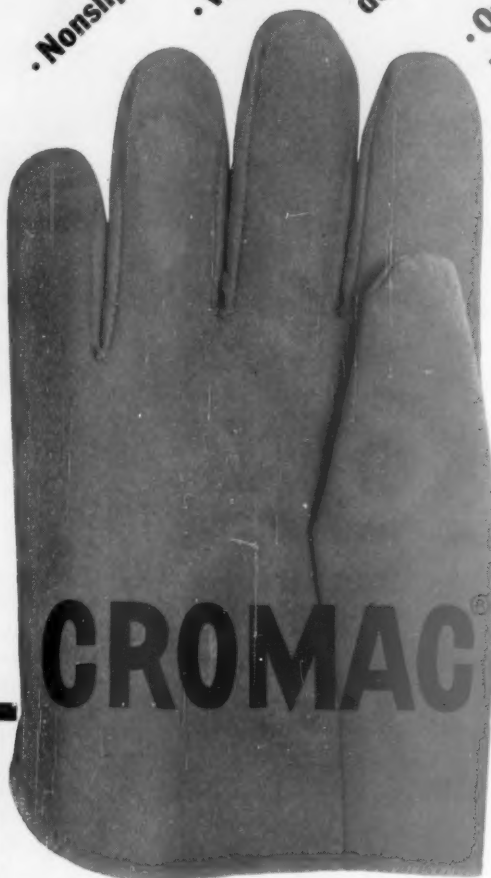
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• Washability

• Superior finger dexterity

• Outstanding abrasion resistance

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that give unique 5-point glove performance

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JOMAC

"Jomac Sells Quality . . . and Quality Sells Jomac!"

No Good Without Know-How

—From page 21

small surface fires to dangerous transformer fires. Under the watchful eye of the instructor, they skillfully bring the fire under control and extinguish it.

Not only are these well-trained fire fighters an asset to the company in the prevention and control of fire, but they play an important part in the company's public relations activities. An informed and intelligent public is pleased and impressed that its utility has such a sincerely demonstrated interest in fire prevention and in rendering high-quality uninterrupted service.

Also promoting good public relations is the company's policy in not restricting its fire fighting instructions to company personnel. It extends the same training to many outside public groups. Among them are local firemen, civil defense personnel, Boy Scouts, U. S. Army personnel, and others. The firm takes on an educational and promotional fire program for the whole community.

Public relations is certainly an important consideration, but it's not the primary influence that encourages the company to promote fire fighting skills at its fire school. Most important of all are human lives.

Prevention of fire and loss of life and suffering is the firm's objective, and the company's fire school is evidence of its sincerity and commitment to that end.

Thousands Enroll in Safe Boating Courses

Boating safety courses sponsored by the Coast Guard Auxiliary and the United States Power Squadrons reached thousands of additional people throughout the U. S. A. this year. The National Association of Engine and Boat Manufacturers reports that the Auxiliary enrolled 92,411 persons in its courses during the past year and that it examined 98,885 pleasure craft.

The USPS announced that 80,000 registered for its piloting classes—up from 47,500 for the previous year.

Power in Protection

—From page 23

that month fell about 160 per cent from 555.3 to 252.9.

Promoting these accomplishments are such publications as *Project Memorandum No. 21*, issued shortly after the start of construction by Uhl, Hall & Rich. The memo designated the "entire construction area as one requiring the wearing of hard hats by all employees and official visitors."

Conduit work in the past winter confirmed need for this regulation. Twin conduits at Niagara are more than four-miles long from the intake 2½ miles above the falls to the 20 billion-gallon storage reservoir east of the power house three miles below the falls.

Each underground conduit contains a 46- by 66-ft. reinforced concrete structure. The two conduits are capable of handling 83,000 cfs of water under a velocity of 14 fps. Excavation for these conduits went as deep as 150 ft. to allow for cut and cover construction.

"The walls were covered with ice," said one project safety official. "When it melted, it would pull out sections of rock—nothing big, but enough to cause severe head damage if the men hadn't been protected."

Head protection at Niagara follows requirements of the U.S. Army Corps of Engineers. Supervised by Uhl, Hall & Rich, this activity gains greater impact through periodic letters prepared for contractors, alerting them to "a condition that may prevail and is not in the best interests of safety." Also, the general engineering firm holds at least one top-level safety meeting every month with each contractor on the project. And there are many sub-meetings.

Contractors such as M-C&S, in turn, hold their own safety meetings.

Standards are maintained with a safety program as rigid and extensive as the millions of cubic yards of concrete placed in the project. And on the working level, where men once screamed when safety equipment became a *must*, protective hats and other gear are saving time, lives, and money . . . and are making converts to the cause of safety.



• Increase Worker Morale

• Reduce Production Costs

with

Scott Demand Respirators!

Bureau of Mines Approval No. 1934

Men who work in atmospheres not immediately dangerous to life, but in which the ill effects are temporary, are completely protected when provided with Scott Demand Respirators. Breathing worries are gone. They work more comfortably and thus produce more.

Scott Demand Respirators provide gentle refreshing air on inhalation only. There is no wasteful, uncomfortable, constant flow to irritate eyes and nasal passages. Wearers say "As comfortable for 8 hours as for 8 minutes."

All models can be connected to plant air supply or high pressure air cylinder systems. Available with half and full-face mask. Write for complete information or call your nearest Scott Distributor.





Fixed Air supply installation, using high pressure air cylinder. Illustration shows Scottoramic Full-Face Mask.



Fixed Air supply installation using plant air supply. Illustrated with Half Mask, for use where face and eye protection are not required.



Portable Demand Respirator Equipment. For use with plant air supply or high pressure air cylinder systems.



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Wire from Washington

—From page 11

cal environment, as well as control methods.

The Secretary of Health, Education, and Welfare spoke of need for stricter enforcement of laws against air and water pollution. At the Secretary's request, the U. S. Department of Justice instituted the first suit under the enforcement provisions of the Federal Water Pollution Control Act, to enjoin a city from polluting a river by discharging untreated sewage and industrial wastes into the waterway.

The Chemical Workers Union, at its annual convention, adopted a resolution expressing its support for the relief of air pollution, and also called for creation of a "national committee on radiation safety" to make objective studies about hazards of exposure to ionizing radiation and to set up uniform standards for the protection of workers and the general public.

The U. S. Department of Labor initiated a new series of industrial

safety publications on mechanical and physical hazards. The series includes bulletins on the control of electrical hazards and on the mechanical handling of materials.

Traffic Safety. The chairman of the House Committee on Interstate and Foreign Commerce, in summarizing major legislative activities of his committee during the past Congress, cited the license registration bill (See "Wire," August 1960) "as a further indication of the committee's continuing interest in traffic safety."

Motor-vehicle registrations are expected to reach 73,868,000 for 1960, according to the Federal Highway Administrator. The 1960 estimate will represent a gain of 3.3 per cent over 1959. Of the anticipated total, passenger cars are expected to reach 61,569,000, a 3.4 per cent increase over 1959; and trucks and buses are expected to number 12,299,000, a gain of 3.0 per cent. Ten states account for 54 per cent of the total registrations.

The Federal Safety Council rec-

ommended installation of seat belts in all government-owned vehicles "except those vehicles where the use of this safety device is clearly impracticable or inadvisable for demonstrable reasons."

In reporting this action, the publication of the Bureau of Labor's Statistics states: "Acting voluntarily and collectively, federal agencies could give lagging public interest [in the use of seat belts] a shot in the arm—at the same time improving their own injury rates."

At the present time, no uniform federal government-wide policy exists on the use of safety belts.

The U. S. Commissioner of Foods and Drugs issued a special report on efforts to curb illegal sales of "pep pills" to truck drivers and motorists, and said the bootlegging of such pills is "a menace to safety on the nation's highways."

He added: "Driving fatigue and the misuse of amphetamine drugs add up to danger on our highways for innocent persons as well as drugged drivers."

"Medical and driving safety experts agree that a driver who uses amphetamines to stay awake beyond the limits of physical and mental endurance may swerve off the road because he sees a traffic hazard that isn't there, or into the path of an oncoming vehicle because he fails to see it."

The federal official commented on "the weakness of the present federal law which is not well designed to cope with this type of violation." He indicated consideration was being given to the submission of legislative proposals to the next Congress.

The District of Columbia adopted new regulations to curb air pollution by motor vehicles. After consideration (See "Wire," September 1960), the District did not enact a proposal requiring installation of devices to deal with blowby or crankcase fumes.

It did promulgate on "excessive" vehicle emissions so such fumes may not be of a density to obscure the background by 40 per cent or more, and prohibited engine idling by buses under certain conditions.

Commercial Transportation. As a

—To page 72



Highly visible, two-sided CAUTION STAND warns pedestrians away from dangerous, slippery floors ... isolates cleaning work to avoid contamination of floors already cleaned. When not in use, the CAUTION STAND folds for compact storage. Contact your sanitary maintenance jobber today for this economical, important investment in safety!

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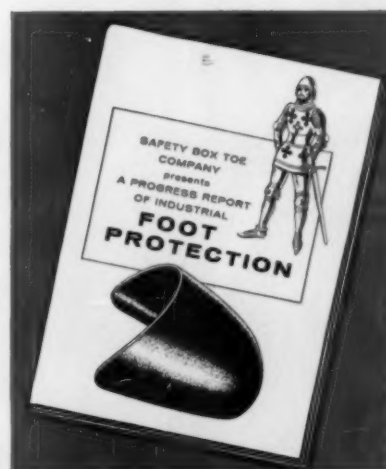
THE BIG SQUEEZE Is ON!

No doubt about it . . . you wouldn't let such a character loose in your plant for all the tea in China. But stop and think a moment and you will realize he is just as well off *barefoot* as he would be wearing *regular* shoes. He would still be a dead pigeon! Leather alone offers no protection when **THE BIG SQUEEZE IS ON.**

REMEMBER . . . It's the *steel toe* that makes a shoe safe. You can always rely on the new improved **WINGUARD** steel toes to give your workers the maximum protection and comfort in their safety shoes.

There is a specific safety shoe designed for every industrial purpose and your safety shoe supplier will be glad to help you make the right selection for your worker's needs.

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SMALL BUSINESS and ASSOCIATIONS

By **RAYMOND C. ELLIS, JR.,** and **JOHN T. CURRY**

Small Business Program Staff, National Safety Council

Tips for Leaders

(Editor's Note: Since most associations are operated through committees, this article is pertinent:)

So you've been elected. Congratulations!

It's an honor to know that your fellow workers put so much faith in you. But any position of leadership always carries with it a great burden, as you'll find out if you haven't already.

Leadership is a hard job, whether in business, church, school, or social organizations. There's nothing particularly romantic about committee meetings. Just plain work. If you're like most leaders, you're

wondering how you can perform your task effectively. Perhaps you've even spent some sleepless hours worrying about it.

Well, here are some tips that may help you get some sleep, and be a good leader:

1. Create a Positive Atmosphere.

In other words, make the sun shine. As the group leader, you are in a better position to set the stage than anyone else. If you maintain a radiant and cheerful attitude, chances are good that the group will reflect your attitude. On the other hand, if you are grumpy and grouchy, you may find yourself faced with the

same. Your group will tend to make the same reaction as you do as *their* leader. That's called *empathy*.

2. Stimulate Differences of Opinion. This tip is contradictory to making the sun shine. But rain, as well as sunshine, helps growth. In every group, there should be healthy differences of opinion. If there's not, rigor mortis has set in.

Often people go along with an idea not because they are convinced, but because they do not wish to be negative. The result is: after the vote is over and it's time for action, they support the program with little enthusiasm or only halfheartedly.

If you're on your toes, you won't let the group have only an artificial unanimity. You'll point out the power of negative thinking. You'll bring out facts the group has overlooked. You'll marshal opposing arguments and ask the committee to refute them. The leader should do anything within the limits of good diplomacy which will cause other members to think and rethink their conclusions.

3. Guide the Discussion. "Anchor the subject before it drifts to sea," advised an experienced leader. Good advice. Nothing is any easier than to get off the subject, unless it is never to get on the subject in the first place.

We all have a tendency to wander into side issues. The discussion leader is like a traffic cop in the sense that he must stop certain traffic. If he doesn't, he soon finds himself in the midst of a traffic jam.

—To page 122



Can Manufacturers Institute here receives its seventh consecutive award from the National Safety Council. Earle S. Honnaford (l.), NSC vice-president for industry, looks on as Dr. Elgin D. Sallee, chairman of CMI's safety committee, presents the award to Roger F. Hepenstal (r.), president of the Institute.

Famous last words...

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...but **ONE!**

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Ampco has the world's most complete line of safety tools — more than 400 types and sizes — including the Ampco All-Purpose Bung Wrench (shown below) which fits 20 different closures.

Catalog ST-10 tells which Ampco Safety Tools to choose for your particular requirements. Write for free copy today.



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West Coast Plant: Div. Huntington Park, Calif. • Southwest Div: Garland (Dallas County), Texas
In Canada: Safety Supply Co., Toronto, Ont.

Wire from Washington

—From page 68

part of a motor-carrier investigation, the Interstate Commerce Commission warned carriers to conduct prompt and thorough investigations of driver applicants before permitting them to operate vehicles in interstate commerce.

The ICC stated: "... we do not consider any carrier to be excused from its obligation to insure that its drivers are qualified and its vehicles are safely operated by virtue of any obligation it has assumed in its contract with an employee union.

"In the area of safety of operation, the carrier's obligation to the public and its ability to abide by the provisions of the Interstate Commerce Act and our regulations thereunder must remain paramount."

The ICC also advised unions: "Unsafe operations present serious hazards to employees. We urge employee organizations to join their efforts with those of management to achieve the maximum of safety in operation."

Aviation Safety. Federal Aviation Administration's deputy administrator said "the real challenge faced by general aviation [which consists of all civil flying except by certificated, supplemental, and interstate air carriers] is one of safety. Unless this challenge is met during this decade, there will be real trouble."

He proposed improvement of the situation by encouraging periodic pilot proficiency checks by qualified instructors.

The director of FAA's Bureau of Flight Safety suggested to an aviation safety meeting that "preoccupation" with jet plane safety in recent years may have been partly to blame for a poorer showing on nonjet planes.

He urged industry and government to pay more attention to conventional and piston aircraft, pointing out that airline fatality rates had increased from 0.45 in 1958 to 0.72 deaths per 100-million passenger miles in 1959, when not one passenger had been injured in a pure nonpropeller jet-plane accident.

"By diverting our attention from classical air safety problems," he

said, "we set the stage for more accidents of the kind we thought we left behind years ago."

He also disclosed the FAA had recently formed a centralized staff of experts for safety and air regulation. This group would be responsible for giving full attention to safety without overemphasizing any one aspect.

FAA, in cooperation with interested groups in the aviation industry, has various research projects under way to find methods to assist pilots in preventing mid-air collisions. FAA also has prepared a model airport zoning ordinance for guidance of local and state governments.

The federal agency states the ordinance has been developed to assist local authorities to protect airports from potential hazards and to increase the safety of flying at the airport.

FAA has adopted the British RAE Visual Glide Path Indicator landing lights as a national standard for use in United States airports, in the interest of promoting safety on aircraft landing approaches and to assist noise abatement.

Use of the system, according to FAA, will help promote air safety by minimizing danger of collisions with terrain and obstructions in the approach area through reducing the possibility of overshooting or undershooting the runway. It will also help in noise abatement by keeping the aircraft as high as safety factors will permit on the landing approach.

FAA also announced proposed new regulations which would, for the first time, establish unified requirements applicable to the construction or alteration of structures affecting the safety of aircraft in flight.

The proposed regulations would affect broadcast towers and the construction or alteration of structures, such as tall buildings, smokestacks, grain elevators, gas storage tanks, and water towers.

Marine Safety. The U.S. Coast Guard issued revised regulations for small passenger vessels not more than 65 ft in length for simplification, clarification, and the incorp-

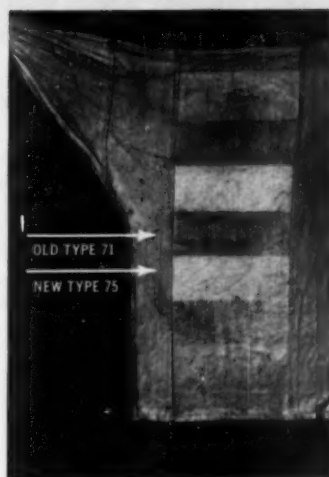


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New, tougher reflective fabric wears longer, reduces your costs

Greatly improved reflective-protective garments made of new "Scotch-Shield" Aluminized Fabric wear *two to three times longer*. They outlast garments made with the original "Scotch-Shield" fabric which first introduced a new concept in heat shielding to industry. Longer garment wear means fewer replacements, lower cost for really *effective* safety garments: hoods, jackets, coats, coveralls, aprons, sleeves, gloves, leggings and complete suits!

Greater durability combined with exceptional heat reflective, spatter resistant performance of new "Scotch-Shield" Fabric keeps hot spot workers cool, safe. They can move easily and comfortably even when exposed to intense radiant heat — do their jobs better, faster with substantial savings for industry.



Proof of new durability:

This millworker's test apron has alternate sections of new Type 75 Fabric and older Type 71. It was used on the job—subjected to extreme heat and wear for 4 weeks. Note how the Type 75 Fabric surface has retained its reflective surface and resisted fabric breakdown.

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oration" of proved procedures and standards.

For the most part, the new regulations will affect only new vessels and not ones already approved or certificated by the U.S. Coast Guard.

The U.S. Department of Labor invoked, for the first time, injunctive powers granted to it under a 1958 safety amendment to the Longshoremen's and Harbor Workers Compensation Act. As a result, a court issued a restraining order to close down a drydock and

ship repair company until hazards are corrected.

The Federal Trade Commission called a trade practice conference in the pleasure boat industry to establish trade practice rules for the industry, covering all types of boats not in excess of 65 ft in length as well as installed equipment and fixtures.

The president of the National Maritime Union, also co-chairman of the AFL-CIO Maritime Trades Department, called for congression-

al ratification of agreements reached in the International Conference on Safety of Life at Sea.

He referred to these proposals: supplementing lifeboats with life rafts on new passenger ships on short international voyages, to cover all passengers; requiring life rafts for 50 per cent of all persons aboard cargo vessels, in addition to the required 200 per cent lifeboatage; powering of new motor lifeboats with compression-ignited engines; restriction of hand-propelling gear to lifeboats carrying 100 persons or less; tightening of drill rules on cargo vessels; and assurance of portable radio gear on each group of tanker lifeboats.

Accidents to Older Persons. The U.S. Public Health Service released its report on health statistics affecting older persons, compiled in the National Health Survey conducted from July 1957 to June 1959.

Data shows about 3,353,000 people 65 years and older were injured annually. This is a rate of 228.5 persons per 1,000 population.

About two-thirds of such persons (2,293,000) were injured in accidents occurring in the home. (Injured as a result of motor vehicle: 865,000; injured while at work: 258,000.)

About 85 per cent of bed-disability days reported were associated with fractures, dislocations, sprains, strains, contusions, and superficial injuries.

Chicago to Be Site of Plant Maintenance Show

Chicago will be the site of the twelfth annual Plant Maintenance & Engineering Show.

The show will run for four days, from January 23 through 26, 1961, at the International Amphitheatre. The conference will run for three days, January 23 through 25. Morning sessions of the conference will take place at the Amphitheatre and evening sessions at the Palmer House.

Advance registration cards, and hotel and conference information can be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17.

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Factory, 330 W. 42nd St., New York 36.

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Safetywise, These Are Worst Months

July, with 8,300 accidental deaths, was the most dangerous month of 1959. August was runner up for danger with 8,100 deaths.

December, leader in 1958 in accidental deaths, was third in 1959.

July led all other months in drownings, with 1,280.

December was No. 1 in traffic deaths in 1959 with 3,650, after trailing October the previous year. August was second in traffic deaths in 1959 with 3,510.

From *Accident Facts*—1960 Edition.



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The Journal

OF THE AMERICAN SOCIETY OF SAFETY ENGINEERS

IN THIS ISSUE

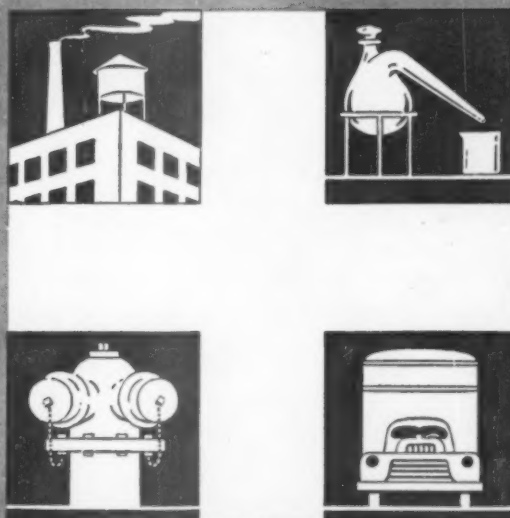
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NOVEMBER, 1960

Five Journal Articles Win Technical Paper Awards

■ THE SECOND ANNUAL presentation of the co-sponsored Society-Veterans of Safety Technical Paper Awards was made October 18, 1960, at the Society's Awards Luncheon in Chicago. These awards, initiated last year to recognize accomplishment and to encourage members to prepare articles and submit them to the *Journal*, apparently have been successful in this latter purpose. In the 1959 competition, nine manuscripts were eligible for consideration and three were selected for honors. This year, 17 papers were considered by the judges and five received awards.

The *Journal* and its readers naturally profit from the increased number of papers being submitted for publication. High quality of the entries becomes evident as they appear in print. Of special interest, of course, are the 1960 winners, which are:

"The Personal Touch" by Robert D. Gidel (first place), to appear in the February, 1961, issue.

"Our Society Must Prepare Today for Tomorrow" by C. Russell DeReamer (second place), which appeared in the May, 1960, issue.

"Safe and Unsafe Use of Rupture Discs" by William W. Allison (honorable mention), in this issue.

"Safety—Its Relation to Cost and Production" by Albert L. Anthony (honorable mention), to appear in the February, 1961, issue.

"How Much Safety Factor?" by Robert F. Schoof (honorable mention), to appear in the February, 1961, issue.

We hope—and believe—that *Journal* readers will find as much of interest and value in these articles as has—the *Editor*.

AMERICAN SOCIETY OF SAFETY ENGINEERS

Organized 1911—Chartered 1915

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OUR PRESIDENT SPEAKS ON SAFETY

IT IS WITH HUMILITY that I accept the honor of the presidency of the American Society of Safety Engineers. By electing me to this office, the membership has indicated confidence in me to lead our Society toward its stated objectives. I assure you that whatever my actions or decisions may be during my term of office, they will be motivated by a sincere desire to benefit the Society.

I don't have to tell you that the act of becoming the president of this Society is accomplished in an entirely different manner from that of attaining the presidency of the country! Since you have not had the benefit of my views as you would had I run for a political office, I feel obligated to outline my philosophy relative to the purposes of the Society and membership in it.

It is my conviction that the Society's most important objective—its primary reason for existence—is to enhance the stature of the Society, its members and our profession—to create and advance a “professional image” which will command an increasing recognition of and respect for the safety engineer's ability to manage effectively the functions necessary to prevent accidents with their consequent human and economic losses. My efforts, and those of your Executive Committee, will be directed to this end but, as a member of the Society, you bear an equal responsibility to yourself and your chapter to help create this “image,” because the end result will be to open greater opportunities in compensation and position for safety engineers. As members we can help achieve the goal by working on those factors which are influential in creating the desired “image.”

At the chapter level, for instance, such factors include the qualifications and caliber of chapter members, the appropriateness and value of meeting programs, the business-like conduct of meetings and the relations of the chapter with the community.

On the national level, aid to chapters can be increased through the activities of the Executive Committee's standing and special committees, assisted by the region vice presidents. With reference

to these “aids,” I want to make it clear that I am not referring to “tools of the trade” such as posters, handouts, etc., for use by members in company safety programs; but rather, I have in mind a public relations pamphlet, a proposed program for a college safety course, a Junior Achievement safety program, a procedure for handling safety legislation in government and other materials of this nature.

One major change which I propose to institute is in the composition of the standing and special committees. Heretofore, an attempt has been made to appoint to each committee a member from each region, which may have merit in providing broad geographical representation but which, I feel, does not make for effective operation. Transportation and budget limitations preclude frequent meetings and necessitate transacting committee business by mail, with possibly a meeting prior to each Executive Committee meeting if enough committee members are available.

My proposal to improve committee efficiency is to appoint committee chairmen by region and allow them to staff their committees with qualified members from their respective regions, thus enabling the committees to meet more frequently. Committee members will be selected by committee chairmen in consultation with their region vice presidents. It will not be required that committee members attend Executive Committee meetings but this is a requisite for acceptance of committee chairmanships.

It will be the primary responsibility of the first vice president of the Society to keep informed on the progress of committee projects and to offer advice and counsel on problems.

The responsibility for the future of the American Society of Safety Engineers will depend, not only on its leadership, but also on every member who, through dedication to the objectives of the Society and through personal professional deportment, will reflect the character of the Society and thus help earn an ever-increasing respect and regard for the profession of safety engineering.

George L. Gorbelle

GEORGE L. GORBELL, PRESIDENT
AMERICAN SOCIETY OF SAFETY ENGINEERS



William W. Allison, supervisor of safety engineering for the Bettis Atomic Power Div., Westinghouse Electric Corp., has been in safety work since 1937 and with Westinghouse since 1949. He joined the Society in 1942 and is a member of the Western Pennsylvania Chapter. This article is his first for the Journal.



SAFE AND UNSAFE USE OF RUPTURE DISCS

AND THE EFFECTS
OF TEMPERATURE ON
RUPTURE PRESSURE

BY WILLIAM W. ALLISON

ADVANCED TECHNOLOGY has rapidly increased the needs for higher pressures and temperatures and, consequently, the more common use of rupture discs. These tiny, dime-sized relief devices have answered effectively the problem of providing a non-leaking high pressure relief device that can be installed in a limited space. However, some serious hazards involved in the improper selection and use of rupture discs too frequently have been overlooked.

Boiler and Pressure Vessel Codes correctly require that all pressure vessels be equipped with an ASME (UG-129 and 133) approved pressure re-

lieving device¹; that the pressure setting of relief devices must not exceed the maximum allowable safe working pressure (MAWP) of the vessel; and that the setting must be stamped on the relief device. To meet these codes, vessels should be designed to meet an MAWP of 20 to 25 per cent above anticipated operating pressure and to use a rupture disc with a burst rating not exceeding the MAWP so that one can safely utilize the vessel to meet his operating requirements. Many of the rupture discs in use today do not have the bursting pressure stamped on them. The reason is very simple. In many cases, there simply isn't room for the old style large flange type rupture disc holder which allows the use of stamped ratings on the disc.

Carefully conducted safety engineering inspections

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have revealed that basic safety, as well as good code requirements, have been violated by using unstamped discs. Investigations have proved that many of these unmarked rupture discs actually had bursting pressures far above the design MAWP of the vessel. In some cases, single unmarked discs in use were actually found to have bursting pressures 200 per cent of the MAWP of the vessel. Other cases have been found where two discs inadvertently were used instead of one. Such human errors can result in catastrophic explosions. Errors of this type readily can be detected and avoided if the rupture pressure is stamped on a tab affixed to each disc. Inspection of a tabbed disc provides simple and positive evidence of the pressure rating of the relief device.

Figures 1 and 2 depict two safety heads using rupture discs, with tabs affixed, which meet code requirements. Figure 1 illustrates a standard bolted flange type safety head (sizes 1/2" to 16") that can be used wherever space permits. The safety head illustrated in Figure 2 is a new special union-type safety head which can be used wherever space does not permit the use of the larger bolted type. These are the only types of rupture disc devices that actually meet code requirements. The use of older style union-type safety heads, commonly used on autoclaves which do not permit the use of discs with ratings (burst pressure) stamped on a permanently affixed tab, should be discontinued.

Another hazard which has been found to be rather commonly overlooked, in the use of rupture discs, is the selection of the wrong material and the wrong temperature rating.

The effect of elevated temperatures on the bursting pressure of rupture discs is quite marked and varies considerably with the type of material the

disc is made of. The table on page 52 (Figure 3) has been prepared to illustrate this point. Figures shown are in per cent of rupture pressure at room temperature of 72 F.

To determine the rupture pressure at any desired temperature, ranging from room temperature to the highest recommended temperature, refer to Figure 3 and multiply the rated rupture pressure by the percentage factor indicated for the particular metal involved. For example, to determine the rupture pressure at 500 F of a stainless steel disc rated 3000 psi at 72 F, simply multiply 3000 psi \times 0.69 = 2070 psi at 500 F.*

If the rupture pressure required is known at any given temperature and it is desired to establish the rating at 72 F, divide the percentage factor indicated in the table into the known pressure rating. For example, to determine the rupture pressure at 72 F of an Inconel rupture disc that is rated at 3000 psi at 500 F, divide 3000 psi by 0.92 = 3190 psi at 72 F.

It is obvious from the above two illustrations that, while an Inconel disc only changes its relieving pressure by 190 psi with 428 degrees change in temperature, the stainless steel disc changes the pressure at which it will release by 1030 psi.

It is a rather common practice for engineers to specify a rupture disc that has bursting pressure and temperature ratings the same or somewhat above the MAWP and temperature of the autoclave or system the rupture disc is supposed to protect. This seems logical enough on the surface but, actually,

**It should be noted that this reduction in bursting pressure corresponds to the reduction in working strengths of pressure vessel materials with increasing temperatures.*

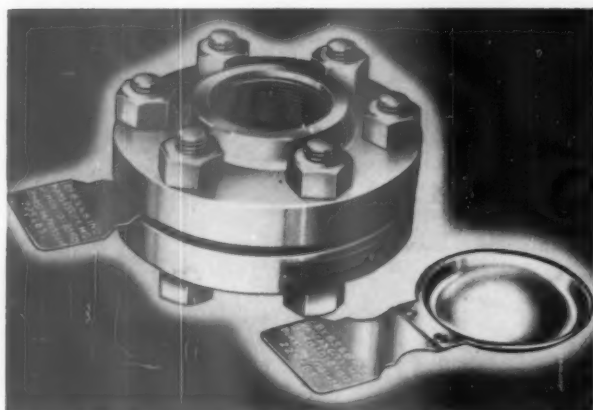


Figure 1—Standard bolted flange type autoclave-pressure vessel rupture disc with tab affixed.

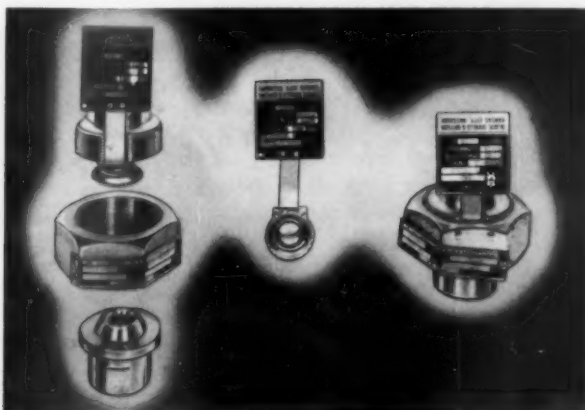


Figure 2—New union type safety head with tab, for use when space does not permit larger bolted type.

the rupture disc very rarely sees the operating temperature of the system. Field inspections and actual temperature readings indicate that the disc normally sees a temperature far below the temperature in the system. In most cases it sees room temperature or about 72 F. If a stainless steel rupture disc rated at 2070 psi at 500 F is used and the disc only sees 72 F, it will not rupture and release excess pressure until the pressure rises 1030 degrees and reaches 3000 psig. Actual experience indicates that commercially available rupture discs burst at the rating stamped on them with generally less than a two per cent variance. Some rupture disc authorities have recommended conservatively that complete assurance that a rupture disc will not burst and release valuable contents of a vessel is best achieved by use of a disc with a bursting pressure 50 per cent above normal operating pressure. It has not been too uncommon to find that the design and/or operating engineer misinterpreted this statement to mean that a rupture disc 50 per cent above the MAWP of the vessel or high pressure system was recommended. This could result in the installation of a stainless steel rupture disc rated at 3000 psi at 500 F on an autoclave, compressor or other high pressure system which has a MAWP of 2070 psi at 500 F. The autoclave or other high pressure system could then reach a pressure of about 4350 psi and could rupture before the disc would rupture. If Inconel discs are used and the same error is made, the Inconel disc would rupture at 3190 and save the vessel.

As the temperature of the rupture disc at any given time normally will not be known and, since there is very little variation in the rupture pressure of Inconel discs with changes in temperature, it follows that the use of Inconel discs will allow disc rupture within about 6 per cent above MAWP of the vessel it is protecting if it is rated at the MAWP and MAWT up to 600 F. A stainless steel disc might not rupture within 32 per cent above

MAWP of the vessel it is supposed to protect. On the other hand, since discs which are mounted in a safety head connected to an outlet (from a few inches to a few feet long) normally see room temperature, the use of a disc rated at 72 F and at (or below the) MAWP will rupture within 4 per cent of the MAWP.

When discs have higher temperature ratings than those which the disc normally sees, there is likelihood that they may fail to protect the vessel unless they are of a material such as Inconel whose bursting pressure is not drastically affected by temperature.

When discs have temperature ratings of about 72 F, then stainless steel, Inconel, Monel, nickel or other appropriate materials can be used safely.

Where heat of reaction temperatures and pressure are involved, more safety is provided with a disc metal that is most readily and most drastically affected by temperature increases. Of course, no relief device can protect vessels against exothermic reactions that result in violent explosions or detonations.

In every case extreme care must be taken to assure that the relief device is not defeated by placing automatic pressure regulators, valves, cooling coils, etc., between the pressure system and the relief device. Anything that possibly can prevent the relief device from seeing any temperature or pressure rise in the vessel sooner or later leads to violent failure of the vessel.

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3. Actual operating experiences.

FIGURE 3
Approximate Effects of Elevated
Temperatures on the Rupture
Pressure of Discs as Compared
to 100% at 72F 2, 3.

Temperature Degree F	Inconel %	Stainless Steel %	Monel %	Aluminum %
72	100	100	100	100
100	99	96	97	98
200	95	85	91	88
300	94	76	87	—
500	94	69	82	—
600	94	68	81	—
700	93	—	78	—
800	92	—	75	—
900	91	—	—	—

BY PHILIP J. BAILEY

YUGOSLAVIA looks at SAFETY

During the months of January and February, 1960, an Industrial Safety Study Team from Yugoslavia toured the United States. For a period of five weeks they observed and studied all phases of industrial safety in chemical plants. Their visit included trips to the operations and laboratories of Charles Pfizer and Company Inc., Union Carbide Plastics Company, Monsanto Chemical Company, Davison Chemical Company, and Walter Kidde and Company Inc.

THE OVERALL PURPOSE of this visit to the United States was to learn about the duties and responsibilities of safety engineers in industrial plants. These Yugoslavians know how to go about making safety inspections and how to make recommendations for safety improvement. They were interested in the scope of supervisory authority for the maintenance of safety rules.

They wanted to know about teaching and training methods for workers. They asked to observe the American industrial approach to the encouragement and enforcement of safety programs. They desired to listen to the safety lectures, look at the safety motion pictures, see the demonstrations we use in educating our workers, and write down all that they saw and heard, including our approach to disciplinary action for repeated safety rule offenders.

This Yugoslavian Study Team visited our country under the sponsorship of the International Cooperation Administration of the United States Government. The expenses for the trip were borne entirely by the Yugoslav Government. The official United States identification of this team was Project 58-90260.

Project 58-90260 was comprised of eleven Yugoslavians. They were engineers, supervisors, technicians and a doctor. All of these people were employed in or by Yugoslavia's chemical industry. The team leader was Dr. Nikola Milution Stanojlovic. He was chief of the medical and safety services of

the Tuzla Soda Factory in Lukavac. A tall man of middle years, he seemed to be vigorous, sincere and intelligent. In addition the team included eight other men and two women. Each one of them was responsible for some phase of safety or health, or both, in Yugoslavian industry.

I met Project 58-90260 on the morning of January 14, 1960, when they visited Kidde's operations in Belleville, New Jersey, to learn about fire extinguishing methods and equipment, fire detection and safety. Accompanying them was A. E. Laurencelle of the Processes and Techniques Studies Branch, International Cooperation Administration, Washington, D. C. He was the manager of Project 58-90260. Also with the group were Mr. and Mrs. Dusko Duisin, the interpreters for the team. They had charming personalities and spoke a clear American-English. All of the team were cheerful, curious, animated, excited.

It became my pleasure and honor to be the first American safety engineer to speak to this group about American industrial safety. Our International Division had approached me several weeks before, telling me about this impending visit of the team to our operations. I was asked if I would talk to them about our accident prevention program. I readily agreed—give any safety man an audience and he will talk!

However, a few days before the Yugoslavians arrived I found I had become nervous about our forthcoming meeting. I have addressed a number of audiences on safety and accident prevention topics. I am afraid I could deliver some of my lectures in my sleep. I am even aware that some parts of my audiences have dozed while listening. That has never made me timid about talking safety. But the thought of talking through an interpreter bothered me. What would he do? Hold up his hand and say "stop" after every statement? The thought was disquieting. I am the type of speaker who gains his momentum as he goes along—low, second, high and over-drive!

On that morning, Mr. Duisin, the interpreter, put me quickly at ease. He asked me to deliver my lecture at a natural pace, just as though I was speaking to a group that understood English. He would trans-



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The author checks his Serbian translation of "Tell-Show-Test-Check" as he addresses Project 88-98260. (Note dominoes to right of Mr. Bailey. They are part of another of his demonstrations.)

YUGOSLAVIA LOOKS AT SAFETY

continued

mit a translation of my remarks through a small but efficient amplifier directly to the button type earphones worn by all members of the study team. They would hear my story just as fast as I related it. And I would not hear, nor be distracted by, the transmission of the interpreter.

He told me that any member of the team desiring to ask a question would indicate this by raising a hand. I should stop. Mr. Duisin would repeat the question in English and my reply would be translated as I spoke. Simple!

When first I had been requested to speak by my company I realized how little I knew about Yugoslavia. I knew that it was a totalitarian state under Communist rule and with only one political party. I knew that its industries and raw resources and railroads were nationalized. I also knew that it had repudiated the Kremlin's authority and had been expelled from the Cominform. It was a Communist country immediately outside of the Iron Curtain. I did not know anything about its size, its natural resources or its manufacturing.

A little research in my son's school books surprised me. Yugoslavia was bigger than I had realized. It is about the same size, maybe a little larger, than a combined New York and Pennsylvania. It has approximately 75 per cent of the population of those two states. Yugoslavia mines coal, bauxite, iron, copper, chrome, lead, zinc, antimony and salt. It produces some petroleum. It manufactures chemicals and pharmaceuticals, nitrogen and nitrides, paints, lacquers, synthetic fibers, leather, textiles, paper and paper products, metals and metal products. It processes food. *It has almost a million workers in nationalized industries.*

As I looked at the study team around the large

table in our conference room that morning, its members did not appear to be any different than those of many other groups I had seen in the same place. They looked like professional people with a slightly continental air.

I began by telling them that *safety integrated into production* is the American approach to accident prevention. We knew from experience that safety had to be a part of production. Therefore, we treated safety in the same manner we treated product design, quality control, job methods, waste control. All of these, and more, are parts of the production technique. The American concept of industrial accidents and injuries considers them to be nonproductive phenomena, costing money, wasting lives, material, products and time.

I then spoke to the team about job-training of new personnel—and additional training for transferred people to prepare them to recognize the inherent exposures which might exist in new jobs.

TRANSLATES KEY TRAINING WORDS

Ahead of time I had prepared some small cards, wallet size, for our guests. After I had distributed the cards I watched, holding my breath, while they scrutinized the four Serbian words: *KAZATI* (tell), *OBJASNITI* (show), *ISPITATI* (test), and *PROVJERITI* (check). I relaxed when I saw their smiles and increased interest. I silently thanked my secretary for her efforts in picking up these translations for me. I now knew they were sufficiently accurate.

I touched the words one by one, on my card. "Tell them about the hazards as you tell them about the job. Show them the hazards as you show all parts of the job. Test them—ask them questions to determine if they are remembering what you tell them. Check them—return at intervals to see that

they have learned and are following instructions."

I swung into the importance of top support for safety programs. "The foreman must be backed up. He must be upheld by those in command. Without that support the foreman is like a fisherman without a fishing line—he is like an airplane pilot without a plane—he is like a soldier without a gun. Those in command must *want* a safe operation before they can expect a safe plant. Posters on a wall can never make a plant or a people safe!

"We believe that the foreman or the supervisor is the most important figure in any organized safety effort. He is in constant contact with his people. He sets the example. He corrects the reckless. He maintains discipline. He takes aside and re-instructs workers who may be developing unsafe work habits. He creates the good attitude about safety by constantly showing his genuine interest in the welfare of the group."

DEMONSTRATES WITH KING-SIZE DOMINOES

A demonstration that drew interest was done with the aid of five large dominoes, twelve inches high, and dotted from double-one to double-five.

On the edge of each domino was a Serbian word. On the double-one, *OKOLINA* for "Environment." On the double-two, *LJUDSKI* for "Human Factor." On the double-three, *MECHANICKI* for "Mechanical Factor." On the double-four, *NESGODA* for "Accident." On the double-five, *POVREDA* for "Injury." Again my resourceful secretary had come up with workable interpretations of the English words!

I placed the dominoes on the shelf in back of me, in a line, their edges to my audience. I touched each domino in turn.

"This one is the workpiece—the factory—the laboratory. Next to it are the human and the mechanical factors. The last two are the accident and the injury."

I tipped *OKOLINA*, or "Environment," and all of the dominoes fell, each one triggering the next one. I fished *POVREDA* from the pile, held it up.

"And in such a manner does the work-injury happen!"

Carefully I realigned all of the dominoes, then removed *LJUDSKI* and *MECHANICKI* from the number two and number three spots.

"If we control the human factor; guard against the mechanical factor . . ." I tilted the first domino again. It fell harmlessly; the last two dominoes remained standing. ". . . there can be no accident, no injury!"

A hand shot up and a question was fired. The interpreter turned to me. "Mr. Dimitri Cemerikic, a foreman of the plant Viskoza in Loznica, asks you how can the human factor, the mechanical factor, be always controlled?"

"We learn in part by experience," I told them. "The only good thing we ever get from an accident is experience. But we cannot afford to sit back and wait for that experience. We must anticipate the causes of accidents—of injuries—and take measures to guard against them."

I demonstrated safety equipment and safety clothing. I showed them samples of eye protection, head protection, footwear, gloves, aprons, coveralls, respirators and other personal protective equipment that we use in our operations. They seemed to be impressed by the amount and variety of these items.

I explained to them about the thoroughness with which we physically examine new employees before they are hired. When we do reject a candidate employee because he does not meet our physical standards, we always advise the person about the reason for rejection. Sometimes we have been of service to such people by calling to their attention a physical condition not suspected until the medical examination uncovered it.

I told them that our physical standards did not

Group photo of the Yugoslavian Industrial Safety Study Team on the Walter Kidde and Company Proving Grounds as they prepare to participate in a fire extinguisher demonstration. In foreground, Dr. Nikola Milutin Stanojevic, team leader (wearing raincoat), is welcomed by Ralph P. Kinder of Kidde organization.



necessarily reject people with amputations, or even the loss of an eye. We were just more careful and exacting in placement of these slightly handicapped. And sometimes we found that these physical losses were not handicaps at all.

I stressed the importance of periodical re-examinations for employees who worked with or around chemicals, paints, solvents, dusts or any toxic material. This should be done to make certain that all safety controls are functioning. I also pointed out the importance of medically examining people returning from sick leave.

I told them about another important group of safety people—our methods engineers—who help to control the human and the mechanical factors by designing safety as well as efficiency into the devices, jigs and fixtures they formulate for production operations.

I related to the team an incident of some years ago when a worker on incentive rates ingenuously had blocked out one control of a small two-hand controlled press. He accomplished this by inserting a one inch bolt, three inches long, into the space in the machine above one of the hand controls. This made it possible for him to keep his right hand free to reach into the machine while his left hand operated the ram. Before his foreman could catch him he had pinched off the tip of a finger.

A methods engineer was assigned the task of stopping any further attempt to block out any controls on these small presses. He accomplished this very simply—by installing a timer in the electrical control box. Now these machines are arranged so that any attempt to block out a control will shut down the machine. And it cannot be started again until the foreman unlocks the control box and resets the timer.

EXPLAINS SAFETY ORGANIZATION

I explained to the Yugoslavian something about the typical American industrial safety organization. I used our own safety organization as a chart. This phase of our discussion aroused the most interest. They wanted to hear about the makeup and function of Safety Committees. They plied me with questions about the rank, status and scope of safety committees in industrial plants.

We have six safety committees at Kidde, including the General Safety Committee. I told them that in our organization these committees were all made up of management people but, in many American factories and laboratories, the safety committees contained some personnel who are not supervisors

or foremen or members of management.

"It is more important," I told my visitors, "that the people on safety committees be sincere in their desire to promote and maintain a good safety standard, and have the vigor and stamina to persist in seeing that the standard is adhered to."

I described how each of our safety committees functioned in a different part of our operations. Our projects are complex: chemical, electronic, machine shop, press, assembly, engineering, research and development. Five of our safety committees function in these environments, monitoring the safety program. They refer to the General Safety Committee only those problems which cannot be resolved quickly because of cost, conflict or some other reason. The safety engineer coordinates the entire safety program, including the work of the safety committees, and reports to top management.

PLANS INCLUDE MANY VISITS

After the meeting was over I had an opportunity to discuss with Mr. Laurencelle the agenda of Project 58-90260 during its stay in the United States. He told me that plans for the team included visits to and discussions with industrial associations, engineering colleges, government bureaus, trade associations, safety councils, underwriters of industrial fire and casualty insurance, municipal fire and police departments, safety equipment manufacturers and other organizations concerned with chemical and industrial safety.

Mr. Laurencelle added that production and refinement of chemicals has today become Yugoslavia's fastest growing industry. When the study team returned to Yugoslavia, it would prepare a report detailing impressions and observations of what it had seen and heard in the United States regarding chemical and industrial safety. This report will be distributed throughout Yugoslavian industry, along with recommendations for the broadening of safety effort in industry and the reduction of work injuries.

When I said goodbye to the study team as it boarded the bus taking it to New York, I felt a reluctance about seeing it leave. These people from a far country had been like intelligent sponges, absorbing safety information as I had never seen it absorbed before. Their endless questions still rattled in my head. I felt inadequate. I would have liked to join them on their safety tour of the United States—listened as they listened—looked as they looked—scribbled notes as rapidly as they did—continuously. They taught me one thing—the concept of safety is international. I hope I taught them something.

Appraising Safety Effectiveness

BY JOHN V. GRIMALDI, Ph.D.

John V. Grimaldi, Ph.D., is consultant for safety and plant protection, General Electric Co. He is first vice president of the Society, which he joined in 1945, and a Metropolitan Chapter member. A prolific and widely-published safety author, this is his third *Journal* article.



Nine principal cost items, typical of manufacturing operations, were studied statistically relative to four measures associated with safety performance. The data were taken from 17 varied businesses over a three year period.

It was indicated that in operating components where there is a fairly good control of all contingency costs, a generally good safety profile prevails.

Differences in safety performance appear to be indicated by differences in severity rates and average severity, rather than the generally accepted frequency rate.

It appears possible to compute, from cost accounting data, a measure which indicates management effectiveness in controlling contingency costs and predicts safety experience.

THERE IS A NEED for more suitable measures of safety effectiveness. Management now is informed of safety progress by either injury rates or plant safety audits. However, zero rates can not indicate degree of performance and variations in the rates may be due to chance rather than effective accident control.

A measure that would alert managers to a gradual loss of accident control, could incite prompt corrective action before severe accidents occurred. To some extent plant audits provide this intelligence, but their value depends on many factors—e.g., the auditor's knowledge, attitude, available time, etc.—and so the reliability of such audits is questionable.

A complication in appraising safety effectiveness has been the logical question, "How much control is practical?" It is apparent, but unreasonable, that plant injuries can be eliminated by stopping work. So could a number of contingency losses which attend productive businesses. For example, machinery damage and increases in costs due to scrap, rework

TABLE I
REGRESSION COEFFICIENTS, STANDARD DEVIATIONS AND DEGREES OF FREEDOM

Factor	Regression Coefficients	
	With 5	Without 5
(1) 5*	.41	
6	.40	.75*
7*	-.55	-.55*
8	.01	-.04
9	.16	.11
10	.08	.05
11	-.13	-.22*
a	-.0295	-.0222
s	.1289	.1315
d/f	9	10
(2) 5	.73	
6	-.59	.04
7	.42	.41
8	.46	.35
9	-.13	-.21
10	.14	.07
11	.07	-.09
a	-.0065	.0063
s	.2604	.2614
d/f	9	10
(3) 5	.09	
6	-.16	-.08
7	-.59	-.59
8	.17	.16
9	.76*	.75*
10	.80*	.79*
11	.12	.10
a	-.2079	-.2063
s	.1182	.1126
d/f	9	10
(4) 5	.59	
6	.73	.38
7	-.11	-.11
8	.20	.26
9	.67*	.71*
10	-.12	-.08
11	.25	-.29
a	-.0792	-.0862
s	.2172	.2114
d/f	9	10

*indicates the regression coefficients of major importance
†standard deviation from the line
‡degrees of freedom

TABLE II
"CORRELATION" MATRIX

	6	7	8	9	10	11	5	1	2	3	4
6	9993										
7	1074	9677									
8	-0030	0150	9856								
9	-2611	3814	-1566	8790							
10	-0072	0442	-0350	-2052	9163						
11	0006	0003	0030	-0454	0052	9993					
5	8882	-0453	-1192	-2709	-0666	-2153	9996				
1	7182	-4812	-0747	-3018	-0090	-2210	7699	9968			
2	0989	3267	3898	-1028	1130	-0832	1476	—	9987		
3	-2935	-2452	0075	2680	5373	0721	-3337	—	—	9302	
4	1923	1732	1443	4763	-2395	-3275	1325	—	—	—	9953

appraising safety effectiveness *continued*

and complaints, among other operating charges, are the result largely of either an improper operational procedure or a failure of personnel to carry out a proper procedure. So too, are disabling injury accidents.

Control, in any case, would appear to be a function of how ably managers persuade subordinates to meet responsibilities fully. A valid means for appraising accident control performance, independent

of injury data, could be expected to spur performance and foster a climate that would advance safety achievement.

One approach to such an objective might be to appraise managerial effectiveness in controlling contingency costs. Data are readily available in typical cost accounting systems. The appropriateness of such an attempt appears justifiable. Disabling injuries (the conventional target of accident prevention

TABLE III
AVERAGE FACTOR SCORES (Three-year Period—14 Variables)

VARIABLES	FACTORS										
	SAFETY			MAN HOURS			CONTINGENCY COSTS				
	Z ₁	Z ₂	Z ₃	Z ₄	Z ₅	Z ₆	Z ₇	Z ₈	Z ₉	Z ₁₀	Z ₁₁
(Gen. Saf. Factor)											
SAFETY											
absenteeism	x ₁	172	91	35	247						
days lost	x ₂	1329	635	456	-538						
no. dis. injury	x ₃	863	-340	-102	993						
tot. no. injuries	x ₄	322	577	-742	-1014						
TOTAL MANHOURS	x ₅				1730						
MANAGERIAL											
scrap	x ₆					610	1280	385	-122	283	770
rework	x ₇					618	-239	330	924	-775	37
direct labor	x ₈					522	67	71	-272	57	-440
shop	x ₉					450	-304	-166	301	-176	1330
work. comp.	x ₁₀					501	-489	-711	692	-307	803
building maint.	x ₁₁					617	163	-1030	-132	671	-445
equipment maint.	x ₁₂					370	22	-179	136	321	184
sales	x ₁₃					451	-264	-133	-260	-303	83
complaints	x ₁₄					802	627	1008	654	447	122

programs) are only one type of accident. Management oversights which precede their occurrence are also associated with such unwanted (accidental) operational results as: scrap, customer complaints and increased shop costs. Hence, a statistical inter-correlation may exist. This interesting possibility prompted an investigation of the feasibility of constructing such a measure.

For the first step in the research method, a number of cost accounting elements were selected. These were considered to be cost variables, controllable by management. They were: (1) scrap cost, (2) rework cost, (3) direct labor cost, (4) shop cost, (5) workmen's compensation*, (6) building maintenance, (7) equipment maintenance, (8) sales value, (9) complaint costs.

Several safety variables were considered: (1) absenteeism*, (2) severity rate—i. e., days lost and charged due to disabling injuries per million man-hours, (3) frequency rate—i. e., total disabling injuries per million manhours, (4) total frequency rate—i. e., total minor and disabling injuries per million manhours.

Seventeen different businesses composed the experimental sample. They were: (1) motors, generators and synchronous condensers, (2) locomotives and car equipment, (3) control systems, motor starters and components, (4) capacitors, (5) distribution transformers, (6) steam turbines and generators, (7) TV receivers, (8) small electrical appliances, (9) home laundry equipment, (10) metallurgical products, (11) general purpose A.C. motors, (12) hermetic motors, (13) conduit products, (14)

*Workmen's compensation and absenteeism were included in the contingency cost and safety variables respectively because these data were so easily obtainable and it was considered worthwhile to explore their value with respect to the study's objective. Neither proved to have any significance.

TABLE IV
COMPONENTS OF CONTINGENCY COST

VARIABLES ON Z_1		
$Z_1 = -0.72425$ $Z_2 = -0.50519$ $Z_3 = -0.22044$ $Z_{11} = -0.0091230$		
Component of	on Z_1	
X_6	-384	scrap costs
X_7	553	rework costs
X_8	433	direct labor costs
X_9	178	shop costs
X_{10}	420	workmen's compensation
X_{11}	456	building maintenance
X_{12}	407	equipment maintenance
X_{13}	433	sales
X_{14}	228	complaint costs

instrument products, (15) heavy military electronic products, (16) electronic tubes, (17) semiconductors.

Figures for each variable were obtained quarterly from these businesses for the three year period 1955-1957. The data then were converted to factors expressible as linear combinations. Contingency cost and safety variables were analyzed as given, as well as on an equivalent manhour basis. Using logarithms of the data facilitated this analysis.

The factor analysis summarization reduced the 12 "safety variables" (four variables for three years) to four safety factors, with little loss of information, since the criterion used was that the factors should retain 90 per cent of the original information when tested statistically. Similarly, the three manhours variables (one variable for three years) were reduced to one factor and the "contingency cost variables" were reduced from 27 variables (nine variables for three years) to six factors.

A step-wise linear regression technique was used to examine the possible relationships between var-

TABLE V
COMPONENTS OF CONTINGENCY COST

VARIABLES ON Z_3		
$Z_3 = -0.46623$ $Z_2 = 0.69084$ $Z_{11} = -0.1518250$		
Component of	on Z_3	
X_6	-13	scrap costs
X_7	-256	rework costs
X_8	-240	direct labor costs
X_9	-135	shop costs
X_{10}	-42	workmen's compensation
X_{11}	250	building maintenance
X_{12}	7	equipment maintenance
X_{13}	-492	sales
X_{14}	462	complaint costs

TABLE VI
COMPONENTS OF CONTINGENCY COST

VARIABLES ON Z_4		
$Z_4 = -0.54184$ $Z_2 = -0.0623008$		
Component of	on Z_4	
X_6	-128	scrap costs
X_7	438	rework costs
X_8	-209	direct labor costs
X_9	101	shop costs
X_{10}	312	workmen's compensation
X_{11}	-134	building maintenance
X_{12}	8	equipment maintenance
X_{13}	203	sales
X_{14}	291	complaint costs

TABLE VII
INTERCORRELATION OF CONTINGENCY COST AND SAFETY FACTORS WITH MANHOURS REMOVED

	Z ₆	Z ₇	Z ₈	Z ₉	Z ₁₀	Z ₁₁	Z ₁	Z ₂	Z ₃	Z ₄
Z ₆	.458									
Z ₇	.1056	.998								
Z ₈	.2959	-.0086	.993							
Z ₉	.4130	-.0092	-.0214	.987						
Z ₁₀	.1534	.0034	-.0075	-.0124	.998					
Z ₁₁	.5563	-.0123	-.0260	-.0363	-.0156	.976				
Z ₁	.1530	-.7119	.0350	-.0533	.0852	-.0902	.637			
Z ₂	-.0929	.3281	.4100	-.3226	.1133	-.0525	-.1817	.989		
Z ₃	.0032	-.2339	.0682	-.0523	.4690	.0060	.4361	.0522	.941	
Z ₄	.2135	.2086	.1554	.6186	-.2566	.3107	-.1618	-.0199	.0462	.981

appraising safety effectiveness *continued*

ables. In computing the regression analysis, the following equations resulted. (The Z's symbolize the mathematical result of the factor analysis of the safety and contingency cost variables.)

WITH MANHOURS

$$\begin{aligned}\hat{Z}_1 &= -0.46215 Z_7 + 0.74929 Z_5 - 0.0055121 \\ \hat{Z}_2 &= (\text{no significant relation}) \\ \hat{Z}_3 &= 0.46623 Z_6 + 0.69084 Z_{10} - 0.1518250 \\ \hat{Z}_4 &= 0.54184 Z_6 - 0.0623008\end{aligned}$$

WITHOUT MANHOURS

$$\begin{aligned}\hat{Z}_1 &= 0.72425 Z_6 - 0.50519 Z_7 - 0.22044 \\ &\quad Z_{11} - 0.0091230\end{aligned}$$

The equations for \hat{Z}_2 , \hat{Z}_3 , \hat{Z}_4 , are the same with and without manhours, as can be seen from the fact that they are independent of Z_6 when manhours are included. The hat over the Z's (\hat{Z}) represents the estimated Z's as predicted by the analysis.

The regression coefficients, standard deviations and the degrees of freedom will be found in Table I. The correlation matrix is Table II. The diagonals are not unity because the means have been removed in the factor analysis process. Using the regression equations, the hypothesis that a relationship exists between contingency cost and safety factors can be tested and is substantiated. In applying the equations the coefficients of the regression lines are multiplied

by the component factor scores (see Table III) of the corresponding factor. That is, in the case of Z_4 we would have:

$$\begin{aligned}\hat{Z}_4 &= 0.54184 (-122) (924) (-272) (301) (692) \\ &\quad (-132) (136) (260) (654) -62 =\end{aligned}$$

The results are tabulated in Tables IV, V, VI. In brief, these are the findings.

The regression analysis of the six contingency cost factors indicates that three (Z_6 , Z_7 and Z_{11}), can be combined to give a *composite* that is highly significantly related to Z_1 , which has been labeled the "general safety factor." (It is essentially a measure of severity. See Table III for the factor score.) The *composite contingency cost factor* shows a strong relationship to rework costs and to a slightly lesser extent all the other variables save shop and complaint costs. The complaint cost is only slightly related and an interesting aspect is the negative relation to scrap costs. The results seem to suggest that an effort to reduce one may adversely affect the other.

The second safety factor (Z_2) is not significantly related to the cost factors, but the third (Z_3), essentially a measure of average severity (i. e., the ratio of severity to frequency rates), is significantly related to two of the cost factors. The importance of this factor to the contingency cost variables is largest for complaint costs and it shows a strong negative relation to sales, a slight positive association with building maintenance and a negative relation with rework, direct labor and shop costs.

When the effect of manhours is removed, the four safety factors correlate with the cost factors as shown in Table VII. The multiple correlations of the safety factors, as predicted from the cost factors, are left effectively unchanged by the removal except for the general safety factor (Z_1). See Tables VII and VIII.

The general safety factor is highly correlated with the composite contingency cost factor and it has

TABLE VIII
INTERCORRELATION OF CONTINGENCY COST AND SAFETY FACTORS WITH MANHOURS

	Z ₁	Z ₂	Z ₃	Z ₄	Z ₅
Z ₆	.771	.147	-.339	.131	1.000
Z ₇	.720	.098	-.300	.191	.889
Z ₈	-.495	.315	-.201	.197	-.056
Z ₉	-.068	.386	-.024	.136	-.117
Z ₁₀	-.159	-.339	.066	.578	-.162
Z ₁₁	.007	.103	.461	-.259	-.061
Z ₁	-.222	-.082	.079	-.326	-.216

TABLE IX
PREDICTED AND ACTUAL INJURY SEVERITY
RATES (1957-58)

	Severity Rates	
	1957	1958
<i>Businesses Expected to Improve</i>		
T. V. Receiver	145	135
Steam Turbine and Generators	290	129
Locomotives and Car Equipment	1226	107
Home Laundry	1328	8
Motor, Generator and Synch.		
Condensers	458	1406 X
Distribution Transformers	777	98
Electronic Tubes	40	93 X
Heavy Military Electronic		
Equipment	508	46
Measuring Devices	184	60
<i>Businesses Expected to Retrogress</i>		
Small Electrical Appliances	363	598
General Purpose Motors	248	83 X
Semiconductors	84	4 X
Metallurgical Products	116	409
Hermetic Motors	44	68
Conduit Products	104	0 X
Σ	394	216
t		1.258
$t_{0.3,28}$		1.056
$t_{0.2,28}$		1.313

certain relationships with the contingency cost variables. One of the conclusions is that, if all of the variables are kept on a fairly low level—i. e., building maintenance costs, shop costs, etc.—while a tolerable rise in scrap costs is present, a generally good safety profile will prevail.

The quality of a measure which uses cost accounting data to appraise safety performance is not suggested by the study. That remains to be studied when an experimental measure is constructed. However, some notion of whether such a measure may be practical can be obtained from Figure 1.

This analysis predicts safety improvement or retrogression for 15 of the 17 businesses in the sample. The safety comparisons are in terms of standard severity rates, the principal component of the "general safety factor." Table IX gives the results of the prediction. Of the nine businesses expected to improve, all but two did. Of the six predicted to retrogress, three did not. Thus, 10 of the 15 (67%) performed as predicted. Although the sample was small and no statistical significance is indicated, the tendency for the businesses' severity rates to go in the direction predicted appears noteworthy. The importance of this observation seems enhanced somewhat by an examination of these businesses' directional progress in controlling fire losses. Using the predictions indicated in Figure 1, 11 out of 15 (73%) improved or retrogressed as expected. See Table X.

In general it can be said that:

■ 1. Two of the four computed safety factors (Z_1 and Z_2) are found to have a relatively close relationship with several of the contingency cost factors. (Z_1) is the most prominent and may be considered the "general safety factor;" it inherently measures severity. (Z_2) essentially measures "average severity" (i. e., the ratio of the severity rate to the frequency rate).

■ 2. Differences in the businesses' comparative profiles of safety performance appear to be explained by differences in their severity rates and average severity rather than the generally accepted measure, frequency rate. It is interesting that the severity rate and the average severity also are closely related to injury costs.

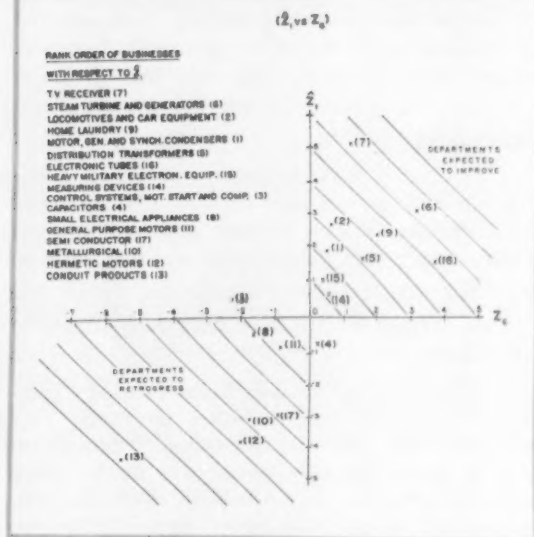
■ 3. The regression analysis indicates several complex relationships which are less descriptive than the relationship between the general safety factor and the composite contingency cost factor. These are interesting, but do not help to clarify the contingency cost-safety relationship. They are reported below:

- The second safety factor (Z_2) is not significantly related to the contingency factor.
- The third safety factor (Z_3), essentially a measure of average severity, indicates a relatively strong negative relation to sales, lesser negative relation to rework, direct labor and shop costs. It is comparatively strongly related positively to complaint costs and less strongly related to building maintenance expense.
- The fourth safety factor (Z_4), which is not in-

TABLE X
PREDICTED AND ACTUAL FIRE LOSSES
(1957-58)

	Fire Losses (cents/\$100 Insurance)	
	1957	1958
<i>Businesses Expected to Improve</i>		
T. V. Receiver	0.005	0
Steam Turbine and Generators	0.026	0
Locomotives and Car Equipment	0.030	0.002
Home Laundry	0.004	0.027 X
Motor, Generator and Synch.		
Condensers	0.002	0.002 X
Distribution Transformers	0.198	0.007
Electronic Tubes	0	0
Heavy Military Electronic	0.067	0.003
Equipment		
Measuring Devices	0.012	0
<i>Businesses Expected to Retrogress</i>		
Small Electrical Appliances	0	0 X
General Purpose Motors	0.007	0.020
Semiconductors	0	0.095
Metallurgical Products	0.013	0.002 X
Hermetic Motors	0.008	0.011
Conduit Products	0.002	0.125
Σ	0.025	0.020
t		1.0073
$t_{0.4,28}$		0.855
$t_{0.3,28}$		1.056

FIGURE 1
GENERAL SAFETY VS. COMPOSITE MANAGERIAL FACTORS



appraising safety effectiveness *continued*

herently descriptive of any one of the usual work injury experience measures, is relatively most strongly related positively to rework costs and to a lesser degree to complaint costs and sales. Negatively, it is most strongly related to direct labor costs and to a lesser degree to building maintenance and scrap.

DISCUSSION AND SUMMARY

The results broadly indicate that in a business where there is fairly good control of all contingency costs, a generally good safety profile will prevail. It appears that the better operation, from a safety point of view, keeps rework costs, direct labor costs, building and equipment maintenance costs, complaint and shop costs on a fairly low level while scrap costs may be tolerably high. (See Figure 2.)

The inverse relationship of scrap costs to other costs, particularly complaint costs, suggests that an attempt to secure improvement in one may have an opposite effect on the other. This curious possibility may be interesting to study further.

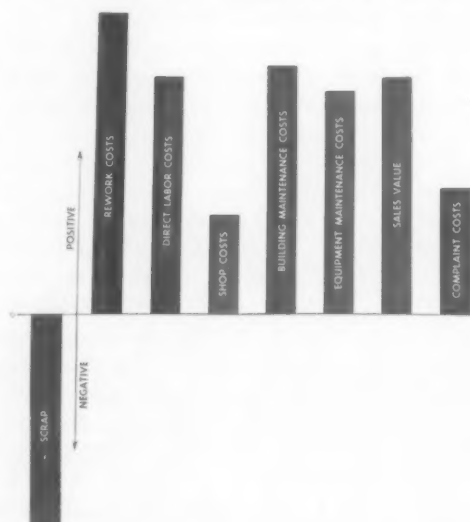
The tendency for building and equipment maintenance costs to be low, where a good safety experience occurs, appears to be contrary to the theory of the case at first glance. Usually it is expected that a generous attitude toward maintenance expense exists in locations where good safety records are found. More careful consideration suggests, however, that the well managed operation (also the

safer one) receives watchful preventive maintenance and thus keeps expenditures to a minimum.

The results indicate that sales are low in those departments where a better safety (in general, severity) record occurs. This would be expected when the injury and sales data are expressed only as totals for a time interval. But the data were examined on an equivalent manhour basis. Also, the safety factor is dominated by the severity variable which is influenced most heavily by the penalty charges and days lost for each injury, rather than the manhours of exposure. The comparison, therefore, is considered significant. The counter relationship between sales and safety effectiveness could be explained by the changing demand for better managerial performance that occurs as sales better or worsen. For example, with the exception of scrap, other managerial variables included in the study tend to be lower when a good safety profile exists. It would seem that managers apply themselves more assiduously when faced with declining sales and that the resultant tightening of control affects contingency losses broadly.

Computing, from management variables, a measure of accident control effectiveness appears promising even though statistically the ability of the "general contingency cost factor" to predict safety experience is not considered significant.

FIGURE 2
DEGREE OF RELATIONSHIP BETWEEN MANAGEMENT VARIABLES AND THE "GENERAL SAFETY FACTOR"



Abstracts

SAFETY AND RELATED FIELDS

All abstracts being published in the *Journal* are supplied by Engineering Index Inc., Engineering Societies Library, 29 W. 39th St., New York 18, N.Y. Because of space limitations, comparatively few of the abstracts from this service can be published in each *Journal* issue. However, subscriptions to the service are available from Engineering Index Inc., which will send, on request, a free 16 page catalog describing the service. For a nominal charge, Index subscribers may obtain copies of any of the articles which have been abstracted and, also, English translations of those published in foreign languages.

ACCIDENT PREVENTION

Anyone for Industrial Roulette? J. E. O'Neil. *Safety Maintenance*, CXIX, No. 3 (March, 1960), pp. 10-11, 14. More than 90 per cent of industrial eye injuries could be prevented with use of safety eyewear; it is stressed that there are few if any industrial occupations that do not involve eye hazards either in themselves or as result of relationship to another occupation or to arrangement of machines that also involve hazards; facts given refuting common complaints against wearing of safety glasses.

Arbeitssicherheit bei der automatisierten Fertigung, O. Seeger. *Werkstatt u. Betrieb*, XCIII, No. 3 (March, 1960), pp. 125-28. Accident prevention in automatic manufacture; discussion of technical problems concerning safe operation, organizational requirements, and physical and psychic problems; recommendations for accident prevention in machining and forming operations, and related materials handling.

Filters for Use during Welding and Similar Industrial Operations, British Standards Institution. *British Standard No. 679*, 1959, 17 pp. Standard relates to filters for eye protection, which may be wholly of glass, plastics surfaced with glass or wholly of plastics; requirements for quality, classification for density and color or circular filters for gas welding, thickness and optical uniformity; tests for permanence, resistance to heat and moisture and for flammability; recommendations for grades of filters to be used for different types of welding.

Industrial Trucks Designed for Safety, O. S. Carliss. *Safety Maintenance*, CXIX, No. 2 (February, 1960), pp. 18-19, 22-23, 26-27. New safety designs include

better lifting mechanisms, speed controls, brakes, better grouping of controls to reduce operator fatigue and automatic transmissions; specific designations used on trucks for general purpose and hazardous use for fire safety; revised Safety Code suggested as valuable literature for users; proper maintenance and supervision of operating rules stressed.

Loss Prevention through Accident Prevention, G. A. Riley. *Modern Castings*, XXXVII, No. 6 (June, 1960), pp. 65-72. Description of accident prevention program at American Brake Shoe Co., New York; two case histories show vast difference in compensation values of years ago and today; charts, photographs and other illustrations show features of good accident prevention program and of bad practices.

New Practices in Supply and Distribution of Electricity in Oil Refineries, H. Stolpp. *Federation of European Petroleum Equipment Manufacturers Congress*, Paris, June, 1959, pp. 249-60. Safety requirements for power supply system; requirements of supply system; requirements of refinery distribution system; automatic switchgear; high speed diagrams of automatic control system (in English, French and German).

Safety Ideas that Paid Off, D. G. DePugh. *Pipe Line Industry*, XII, No. 1 (January, 1960), pp. 41-42. Ways of improving safety conditions during construction of pipe lines by modifying machinery and equipment; safety through innovations on shot-blast machines, cranes, coating applicators, tractors and double-jointing systems.

Safety Management in Electrical Wire and Cable Plant, P. Contardo. *Wire and Wire Products*, XXXV, No. 7 (July, 1960), pp. 866-68. Methods and tech-

niques used in many successful programs to achieve maximum efficient production with minimum injury to personnel and minimum damage to equipment, machinery, structures and material.

Safety Ring Guards against Accidents. *Plant Engineering*, XIII, No. 12 (December, 1959), p. 122. Ring guard sensing device, designed by Liberty Mutual Insurance Co. for Watchbands Inc., has pneumatic construction which prevents machine operation if worker's hands or fingers are in danger zone; schematic diagram and description of operation.

Shock Hazards of Electric Currents, A. R. Morse Jr. *Engineering Journal*, XLII, No. 11 (November, 1959), pp. 50-54. Electrical and physiological effects of electric shocks; "Let-Go" current; exposure over 80 ma can cause instantaneous death by fibrillation; 1/100 second of contact may be fatal; factors of resistance or of "total body resistance" are contact resistance, resistance proper of body and skin resistance; complete changeover to three-prong, grounded chasis 120-v system is recommended.

Statistical Model for Evaluating Reliability of Safety Systems for Plants Manufacturing Hazardous Products, L. B. Kahn. *Technometrics*, I, No. 3 (August, 1959), pp. 293-307. Technique for determining probability of failure of plant manufacturing hazardous product such as chemical plants and petroleum refineries; mathematical model developed can assist in proper selection of plant hazard control systems and provide means for economic evaluation of incremental risk protection; example using simplified plant given.

Vypocet a bezpecnost pri provozu parnich kotlu, P. Bettzieche. *Hutnické Listy*, XIV, No. 7 (December, 1959), pp. 1169-71. Safety calculations for service of steam boilers; recommendation that safety factor be applied to service and temperature as well as to stress; momograph which enables safety to be expressed in terms of those parameters; time-safety values provide more exact concept of service life of unit than mere stress-safety values; results suggest that lower operating temperatures may permit operation at higher loads, while higher operating temperatures may necessitate greater caution in design of power plant equipment.

Why Grounding Pays, W. J. Neiswender. *Plant Engineering*, XIII, No. 7 (July, 1959), pp. 88-90, 176. Review of various methods and equipment for grounding electrical circuits to keep voltage confined and protect personnel; illustrations of circuit diagrams; best methods described.

INDUSTRIAL HYGIENE

Occupational Dermatitis: Its Cause and Cure. *Safety Maintenance*, CXIX, No. 2 (February, 1960), pp. 43-46. Causes divided into four groups: physical and mechanical agents, chemicals, botanical hazards and

biological agents; each discussed; preventive and protective measures; suggested safeguards for employees listed.

Safety Limits of Hazardous Materials. *Safety Maintenance*, CXIX, No. 1 (January, 1960), pp. 33-35. Tables of threshold limit values for various gases and vapors, toxic dusts, fumes and mists, and mineral dusts adopted at American Conference of Governmental Industrial Hygienists, April, 1959; values represent exposure for repeated normal workdays.

NOISE CONTROL

Protection against Noise, F. Odend'Hal. *Mass Production*, XXXVI, No. 3 (March, 1960), pp. 110-12. Noise protection in industrial activities; noise effects on human hearing, work performance and spoken communication; effectiveness of wall or door designed to protect occupants of one room from noise in adjoining room, known as "sound transmission loss;" transmission loss achieved by various wall designs, with effect of materials expressed in terms of wall surface weight is shown.

Variation in Ear Protector Attenuation as Measured by Different Methods, L. Weinreb, M. L. Touger. *Acoustical Society of America Journal*, XXXII, No. 2 (February, 1960), pp. 245-49. Attenuation measurements of four types of ear protective devices; threshold shift measurements yielded higher values of attenuation than either loudness balance or microphone method, but results varied with frequency for various types of protectors.

NUCLEAR SAFETY

Equipment for Eye, Face and Neck Protection against Radiation Arising during Welding and Similar Operations, British Standards Institution. *British Standard No. 1542*, 1960, 18 pp. Standard specifies requirements for equipment to protect operator above shoulders against harmful radiation when engaged in welding, cutting and similar operations; equipment is designed to use protective filters, with or without filter covers, and to give protection against radiation of wavelength greater than 200 Å.

Status of Regulation of Ionizing Radiation on Federal Level: Responsibilities of U.S. Public Health Service, F. J. Weber. Sixth Nuclear Engineering and Science Conference, New York City, 1960. *Preprint No. 21*, 16 pp. (Published by Engineers Joint Council, New York.) Under Constitution, ultimate responsibility in United States for health protection, including general phase of radiological health, is vested in the states; Public Health Service also cooperates in radiological health matters with other Federal agencies, with universities and voluntary organizations and with international organizations and committees.

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AMERICAN SOCIETY OF SAFETY ENGINEERS

Membership Information

THE American Society of Safety Engineers has established the following classifications of active membership.

ASSOCIATE MEMBER—To be eligible as Associate Member an applicant shall be at least twenty (20) years of age and

a. Shall have a degree in engineering from a college or university whose curriculum is accredited by the Engineers' Council for Professional Development or shall have legal registration as a professional engineer and, in addition, shall be engaged in safety engineering with at least one (1) year's experience, no time being credited to this one (1) year unless at least fifty (50) per cent of the time was devoted to safety engineering, or shall have supervision over the safety engineering function of his organization; or

b. Shall have a college degree other than that specified in "a" above and, in addition, shall be engaged in safety engineering with at least three (3) years' experience, no time being credited to this three (3) years unless at least fifty (50) per cent of the time each year was devoted to safety engineering; or

c. In lieu of a college degree, shall be engaged in safety engineering with at least five (5) years' experience, no time being credited to this five (5) years unless at least fifty (50) per cent of the time each year was devoted to safety engineering.

MEMBER—To be eligible as a Member an applicant shall be at least thirty (30) years of age, shall have the qualifications required for Associate Membership and also shall have (5) years' experience in addition to that required by and of a type defined in the subsection of the requirements for Associate Member which is applicable to him.

FELLOW—To be eligible as a Fellow, a Member shall be nominated upon the unsolicited recommendation of three (3) other Members, shall be at least forty (40) years of age, shall have been a Member for at least thirteen (13) years, and shall have been engaged in safety engineering for at least twenty (20) years, during at least five (5) years of which he shall have been in responsible charge of the safety engineering function of his organization. In addition, he shall have made an outstanding contribution to the safety engineering profession. Recommendations of candidates for the Fellow classification, along with substantiating data, shall be sent to the Secretary of the Society, who shall submit such recommendations and substantiating data to the Committee on Membership. The Committee on Membership shall report its findings to the Executive Committee for action. Fellows shall be elected by a majority vote of the Executive Committee.

AFFILIATE MEMBER—To be eligible as an Affiliate Member an applicant

a. Shall be at least twenty (20) years of age and shall be engaged in safety engineering with at least one (1) year's experience, no time being credited to this one (1) year unless at least fifty (50) per cent of the time was devoted to safety engineering; he may remain in this classification while qualifying for Associate Member or Member Classification; or

b. Not being engaged in safety engineering, shall be at least twenty-five (25) years of age and shall have pursuits, attainments in accident prevention, or practical experience, extending over a period of at least three (3) years, which shall qualify him to cooperate with members of the Society and to render service to the Society.

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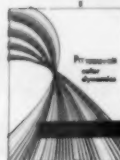


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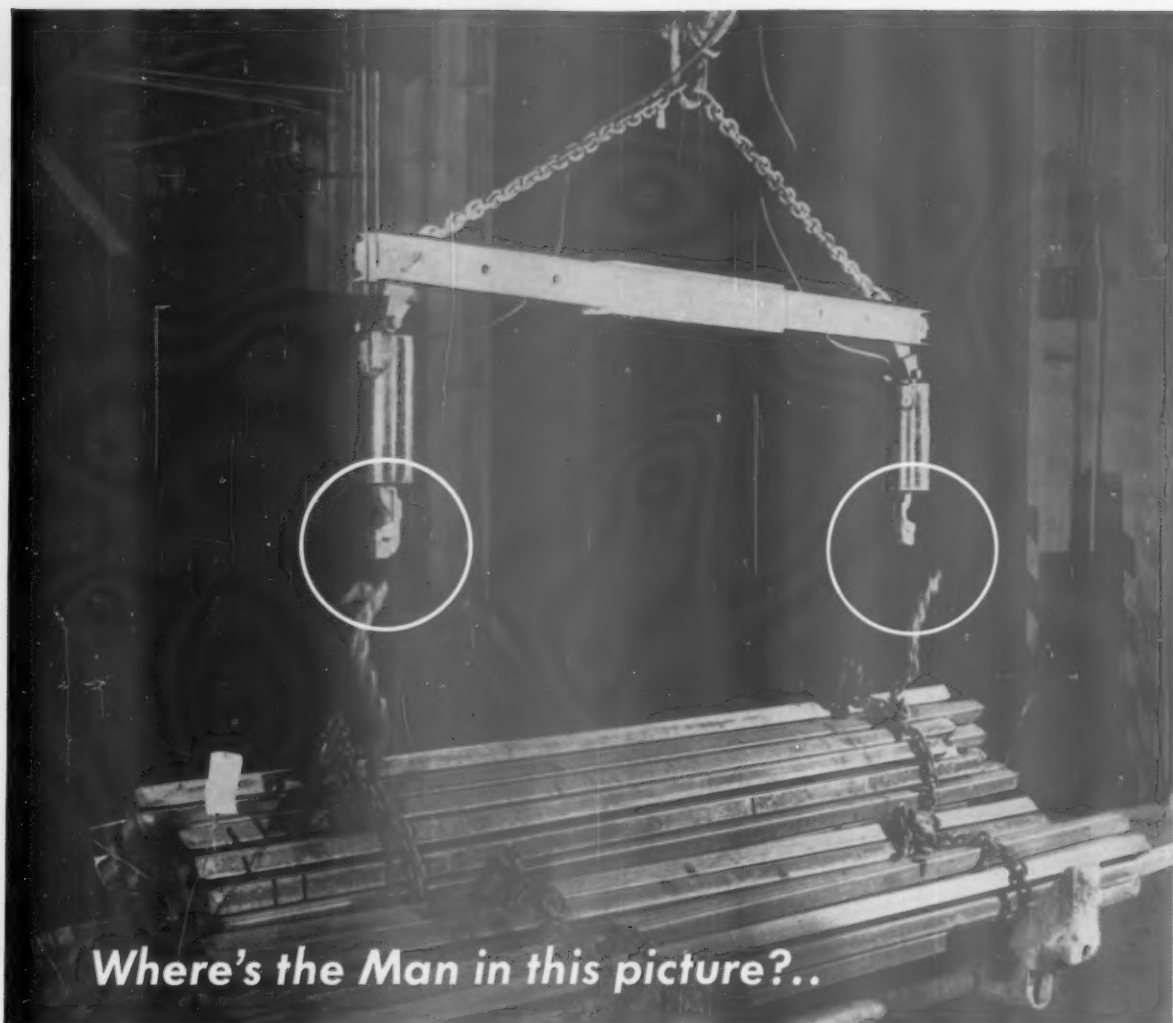
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Off the Job

—From page 62

To the schools in our small county with an enrollment of about 4,000, we furnish various bulletins three or four times a year (one for each of the kids to take into their homes). The more recent bulletins have concerned school bus and bicycle safety.

We have for several years made available to our employees at cost fire extinguishers, first aid and snake bite kits.

We furnish free wet felt for the soles of fishermen's shoes and boots. Trout fishing is one of the finest sports in western North Carolina, and our personnel swear by the wet felt, when it comes to prevention of falls on slippery rocks.

At our employee recreation area, where we have from 100 to 200 swimmers and non-swimmers daily during summer months, we stress the importance of waterfront safety. Capable lifeguards are on duty seven days a week—eight to 12 guards at all times. Each is a college student having a senior life-

saving certificate, and several of them have had the National Red Cross Aquatic School instructor's course in waterfront safety.

Swimming classes are conducted for youngsters and adults, and in the past 15 years more than 2,000 beginning swimmers have passed their tests for swimming 50 yards or more. In fact, we don't allow anyone in the deep water area, until they pass such a test under the supervision of one of the lifeguards.

Incidentally, the National Red Cross predicts a drowning a year at such areas, and we're proud to be in our 15th year of operation without tragedy.

In addition to a playground supervisor on duty seven days a week, a boys' coaching school is conducted three days a week from 9 a.m. to noon. This is handled by college students, who emphasize sportsmanship in teaching various athletics. Safety is tied in with every activity.

With the use of two safety bulletin boards inside the main entrance to our plant, we continuously subject our personnel to per-

minent messages about safety on and off the job. We use 8 and 17-in. green plastic letters; and the boards are 4 by 6 ft. and 6 by 16 ft. in size.

Messages have been changed from three to five times a week for the past 10 years, and at least one out of every four messages on the large board pertains to off-the-job safety. The smaller board is seen by employees as they leave the plant. Every message on this board covers items off the job.

Until July 1, 1959, we didn't attempt to keep an accurate record of off-the-job accidents. However, we do know that 12 of our employees have died as a result of them, since the plant started operations 21 years ago . . . compared with one fatality on the job during this period. These 12 deaths were caused by: auto wrecks—6; private airplanes—2; drownings—2; hunting—1; and wood saw—1.

From July 1, 1959, to July 1, 1960, not counting a fatality from drowning and one that resulted from an auto wreck, the personnel of our plant experienced 33 disabling

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injuries off the job that made them lose 1,018 days from work.

These were: auto wrecks—21 (1 fatality); home—12 (several severe injuries); public—2 (1 drowning). During this same 12-month period on the job, we had four disabling cases with a total time charge of 117 days.

We're not proud of our on-the-job experience, but in comparing it with the 35 cases mentioned, it does prove to us that we still have work to do in getting safety into the homes of our personnel.

Let's take a look at the cost to our plant for the 35 cases referred to. This includes life insurance, hospital and surgical costs, and weekly benefits for days lost from work.

It doesn't include necessary overtime paid on numerous occasions (hundreds of dollars) or the seemingly intangible production efficiency lost when members of a team must be supplemented by new players when an accident benches one or more employees.

Cost to our plant was \$22,500. The 33 injured employees lost about \$12,500 in wages during this

12-month period. A total cost to the workers and Paper Operations of \$35,000. Incidentally, the four cases on the job during the same time carried a compensation cost of less than \$500.

We can't overlook the fact that, when a company or corporation pays money from their profits for accidents, they're paying money for something that could be prevented, avoided. In effect, they're paying money for nothing!

One example, showing how much a single off-the-job accident can cost, is an auto wreck that involved three of our machine room employees March 8 this year. These men are a foreman, a machine tender, and a third hand.

The trio was returning from a short vacation in South Carolina, when their car was struck by an auto entering the highway from a side road.

The foreman received multiple contusions, four badly broken ribs, and lost 47 days from work.

The machine tender's left leg was broken in five places above the knee. He lost more than 114 days

from work and won't be able to return to work before January or February of next year.

The third hand suffered severe internal injuries and facial disfigurements that made him almost unrecognizable. He lost more than 59 days from work and has already undergone surgery for facial scars on several occasions. Estimated cost of this plastic surgery will be about \$7,000.

The entire cost to the three employees and to the plant on this one case will be between \$15,000 and \$20,000.

It appears simple for our employees to put on a cloak of safety when they enter the plant and to discard it as they pass through the gate on their way home. These same employees insist that, safetywise, every suggestion at the plant should be followed immediately. Yet, they neglect their homes, their loved ones, their automobiles, and their own safe actions—away from the plant!

We all know the great importance attached to setting the right example—that actions will often be copied whether they are right or wrong, safe or unsafe. We know children mimic actions of their parents—and that some traits have even been known to become hereditary.

Regardless of how strong management's interest might be from the humanitarian standpoint, let's not forget it is also vitally interested in accident prevention on and off the job from the standpoint of reducing operating costs.

No plant, company or corporation can stay in business without showing a steadily increasing profit to more than match rising operating costs, and it's the responsibility of every person connected with accident prevention programs as well as others in supervisory positions to assure this profit.

We can do this by helping eliminate the needless cost of personal and non-injury accidents on and off the job.

Safety in the Fifties

During the decade of 1950-59, 145,300 workers were killed on the job, and 19,500,000 workers suffered injuries disabling beyond the day of the accident.



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Swivel**

Prices f.o.b. Mentor

3-ton, \$39	9-ton, \$62
6-ton, \$46	15-ton, \$92

Safety engineers' first choice for most efficient handling of "heavies," 3 to 15-ton dies, etc. No J & J has ever failed. Hook swivels without loosening bolt. Permanent assembly: forged hook, swivel bushing, chrome-vanadium bolt with self-cleaning threads (hex-head has knurled ring). Send in your old J & J's for conversion to new swivel: 3-ton, \$24; 6-ton, \$29; 9-ton, \$39; 15-ton, \$59. All prices f.o.b. Mentor. Ask for latest bulletin.

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This model's changed a bit over the centuries. It's soft as glove leather now. In fact it *is* glove leather—and fully leather-lined—with a comfortable cushion inner sole. It goes on and off *fast* now, too—thanks to hook-on rawhide laces. And there's an oil-resistant Neoprene® crepe heel and sole. But one thing *hasn't* changed: you still get protection where it counts. *Over the instep*—via thick, overlapping leather flaps that guard against chemicals. *Over the toe*—via a toe-box of leather-lined steel. Thom McAn's six-inch tan boot, S-4187. Sizes D, EE 6-12.

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- ☐ Illustrated list of Thom McAn Safety Shoes
- ☐ Set of safety posters

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Well-Dressed Deer Hunter

—From page 46

flected and the sensitivity of the eye to the color. Relatively few objects seen in the fields and woods have luminances (photometric brightness) of over 50 per cent. Exceptions are white rocks, or white birch.

Fluorescent materials absorb light of other colors from white light, convert it to and add it to the light reflected, thus enhancing the

brightness. Ultraviolet, as well as part of the violet and blue light, is absorbed by these fluorescent materials. A large portion of the absorbed energy is converted into orange light which is emitted and added to the reflected, orange light. For a given color the reflectance of nonfluorescent materials will be less than 100 per cent, while a fluorescent material can add enough converted energy to exceed 200 per cent. (Table 1.) The fluorescent

materials appear much brighter than ordinary colors, especially at dawn and dusk when the light is poor. This unnatural greater brightness has a weird artificiality in the woods that makes the colors conspicuous for men with normal or deficient color vision. The fluorescents remain bright for some time after there is no longer enough light for nonfluorescents to be seen.

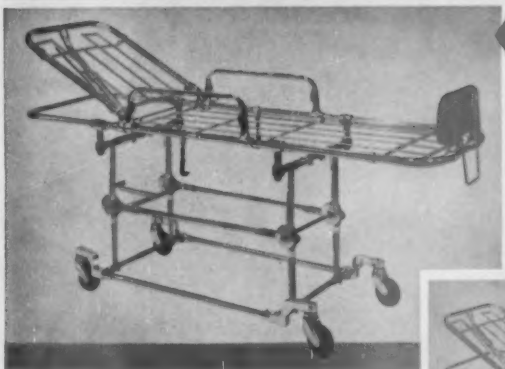
Test Program

A 2.5 mile course was marked with the aid of a rope through clear areas, woods (evergreens and hardwoods), brush, up and down hill and across a small swamp in an isolated area of Fort Devens. Standard Army silhouettes of a man were placed at 25, 50, 75, or 100 yards from the trail, numbered and draped with a colored vest. The colors were distributed at random and the crew was careful not to leave any tracks or indication of the location of the targets that could be seen from the main trail. Two-man teams walked the course at spaced intervals, and an observer pointed out and named the color of all the targets he could see. The recorder was provided with field-glasses for reading the identification numbers marked on the heads of the dummies and listed the color name given by the observer against the target number. No observer or recorder had any information as to the color or location of the targets. During October when the fall foliage colors were abundant and again in November after the leaves had fallen, 100 two-man teams covered the trail. In January, 25 two-man teams repeated the course through snow. These observations from the trail are called Course A.

In Course B the vests were worn, with a random arrangement of colors, on soldiers who successively walked the trail. The observers and recorders were stationed at sufficient intervals for separation along or near the trail. The objective was to determine the distance at which the colored vests could be seen and whether the colors would appear to change as they approached the observer. The soldiers were not good enough at estimating distances in the woods and brush to provide the desired information.

On the completion of both

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Here's the perfect answer to cars that have less head-room, and for over-head hanging stretchers. Although this cot folds to only 7½" high, it elevates to 34" hospital-bed height, **instantly and safely!** Famous Washington quality and craftsmanship make it today's finest cot. Reasonably priced at \$143.50.



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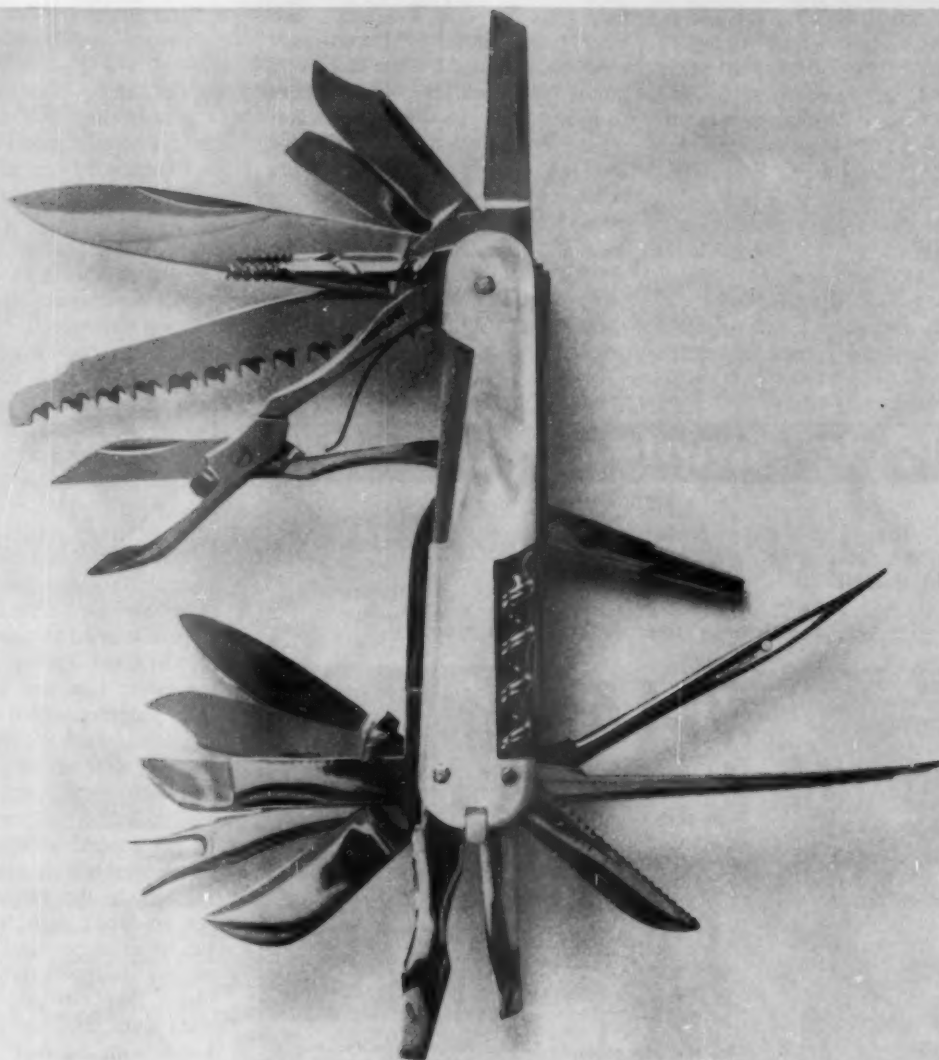
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Course A and B the observers were asked which color they thought was easiest and hardest to see, which was the most artificial or least like natural objects seen, and which color they would prefer to wear for protection if they were hunting. The third test, Course C, was a forced-choice shooting test similar to hunting. Targets painted to resemble the hind end of a white-tailed deer were mounted at various places along a hill on pivots so that when turned edgewise

they were invisible but were seen when turned flatwise. Men in nearby dugouts controlled the targets by pulling ropes on telephoned orders from the firing position. The targets were exposed in a random order for four seconds. Eight targets were painted white, and two each blaze orange, fire orange, arc yellow, yellow, and red. (See Table 1.) Two silhouette targets of a man, one painted yellow and the other fire orange, were set at the edge of the woods along the clearing. No neon

red targets were included as no paint was available. The "deer" were 50 to 245 yards from the firing position and subtended 19 minutes of arc at the observer's eye from the farthest position (the colored part subtended ten minutes).

The average luminance of the target area was measured with a calibrated Luckiesh-Taylor Light Meter. A soldier with an Army rifle was stationed at the shooting position and told to shoot all white "deer," but none of the colored "deer." The color and number of each "deer" shot at were recorded. During the latter runs, also, whether the soldier raised the gun or flinched but did not fire were recorded as it appeared that as dusk approached in some cases the men might have shot had the target remained visible slightly longer than the four seconds. The yellow targets seemed to arouse uncertainty when the average luminance of the target area was 1 ft.-L or less. The program called for 100 men to shoot at each session with colored foliage, after the leaves had fallen and with snow cover. This was not accomplished. It was not possible to get started as early as desired. In November heavy clouds and rain made the range too dark to see so fewer men had the opportunity to shoot and fate thus removed proportionally more deficient than normals. The series of tests were under way by late afternoon with average luminance of the target area of 400 ft.-L and continued until it was too dark to see the targets at about 0.02 ft.-L. Shooters in October numbered 42, in November 32, and in January 23.

Observers

Dr. Panjian screened some thousand men using AO-HRR Pseudo-Ischromatic Plates illuminated with a standard Macbeth Easel Lamp and found 6 per cent to have deficient color vision. This was less than the 8 per cent usually found among men in the United States. In planning the field tests for the colors, enough deficient were chosen to make up 8 per cent of the observers. Unfortunately, Army maneuvers, sickness, and the shortening of field work from bad weather reduced the

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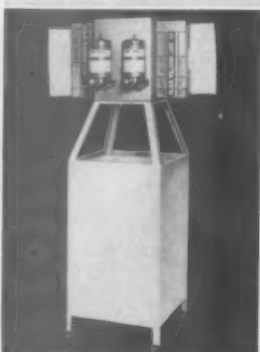
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On the fireboat "City of Portland", a Rockwood FOAM system with variable automatic proportioning of the fire smothering foam liquid includes Rockwood turret nozzle converters, hose nozzles, applicators and extensions. Pumping power supplies a continuous output of 7,000 gpm. Smaller photo shows refueling on this boat with Double Strength FOAM liquid through a trough-like funnel into a 250 gallon FOAM storage tank.



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*American Pub. Health Assoc., Oct. 15, 1954

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TABLE 1. COLOR SPECIFICATIONS

	Chromaticity Coordinates		Luminance Factor	Dominant Wavelength	Excitation Purity	Peak Reflection	Remarks
	x	y	Yx	mμ		λ at mμ	
White	0.3110	0.3190	80	552	0.02	82 700	Cloth
*Blaze orange	0.6065	0.3853	61.5	597.0	0.98	219 600	In vinyl base on nylon
*Fire orange	0.6323	0.3364	37.3	608.7	0.92	180 615	" " " " "
*Neon red	0.5513	0.2817	25.8	492.6	0.59	143 633	Cloth
*Arc yellow	0.5529	0.4343	78.4	587.6	0.97	189 582	In vinyl base on nylon
Yellow	0.4463	0.4410	48	579	0.70	73 700	Cloth
Yellow ("deer")	0.4694	0.4666	85.8	598	0.81	78 670	Paint ("S-M Yellow F4172")
Red	0.6152	0.3219	8	613	0.82	66 650	Cloth
#(Yellow, Calif)	0.4644	0.4666	55	578.1	0.81	74 680	Paint)

* Data on fluorescents courtesy of Richard A. Ward (5).

From (4). The red paint used on the "deer" was Benjamin Moore Imperio Brilliant Red.

deficients disproportionately and 35 men of 526 observers or 6.7 per cent deficients were available for the field tests.

The AO-HRR Plates indicate type and something of the severity of the defect. Men classified as mild showed little difference in the observations from the normals. Most of the medium and severe deficients were also tested with an anomaloscope by Dr. Richards to clarify the screening test. Three unclassifiable individuals were not used in the field tests. The defec-

tives were: mild 7; protans* 13; deutans** 15. Eight protans and 4 deutans were so severely deficient that matches on the anomaloscope were possible throughout the scale. The marked darkening of the red separated the protanopes from the deuteranopes.

The relative brightness of the colors was measured by observing round discs of each color mounted on a gray card through a Luckiesh-

*Red deficient red-green confusers.

**Green deficient red-green confusers.

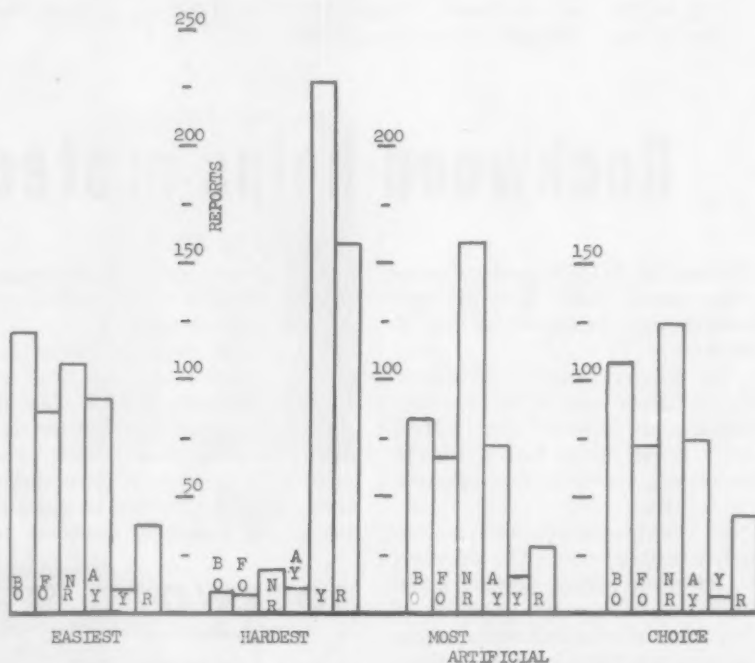


Figure 4. Opinions of the observers on finishing courses A & B.

ONE PULL OF THE DIAL AT HQ

rings up to 480 telephones *simultaneously* with a group-alert message!

Something long needed in military communications has now been provided by Bell System research.

It's the new *Group Alert and Dispatching System*, and it works like this:

An authorized person dials a single-digit code on a special telephone. Immediately, at all associated home or office telephones (up to 480 of them) a distinctive, staccato ring is heard. This ring continues for several minutes or until the phone is answered. If the line is busy, the system waits until the line is free, then rings.

The group-alert call does not interfere with regular service on the associated telephones. An optional feature lets a dispatcher dictate an alert message which can be instantly recorded and automatically broadcast, over and over again, to all telephones in the system.

This new development is now being tested for military and non-military defense applications. It will also be useful to volunteer fire departments, power companies and for Civil Defense warning.

The Group Alert and Dispatching System is an outstanding recent example of progress in the Bell System's continuing program to improve both military and civilian communications.

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to save life when breathing stops and seconds count . . .

AMBU
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Every plant or shop needs AMBU hand-operated resuscitator and foot-operated suction pump—to meet respiratory emergencies—when and where they happen.

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Moss Visibility Meter. The colors were mounted so as to be exposed one at a time, lighted by the easel lamp and at a distance to subtend two degrees at the observer's eye. The visibility meter darkens and diffuses the view until a threshold is reached when the color is no longer seen as a color. (Figure 1.)

The daylight lamp was too bright for men with normal color vision to reach the color threshold for the white, blaze orange, and arc yellow; and this is indicated by the irregular tops of the bars in the figure. The colors are less bright for the deuterans and much less bright for the protans. As would be expected, the yellows appear brighter to the deuterans. Blaze orange appeared slightly brighter under these conditions to the protans than the red or the yellows, but the differences in threshold are insignificant. The brightness of the fluorescent colors is less under the Macbeth Daylight Lamp, as the former provides less ultraviolet and blue than outdoor lighting. The threshold results indicate relative brightness as seen against a neutral gray paper with 21 per cent reflectance; a visual adaptation very different from the background of the field tests. There is some evidence that deuterans may have higher brightness thresholds than normals (Graham, *et al*, 1960). Unfortunately not all of the color deficient were available for this test. Some of the tests were made in the base hospital and others within an Army truck in the field so screened that there was no daylight on the test chart.

The observations of the normal and deficient color vision will be discussed separately. Proportionately more protans were used than deuterans than normally occurs in the population as deficient red vision was important in this problem. One man had such high color thresholds that the colors looked alike to him much sooner at dusk than for the men with normal color vision. As a result he shot at all colors in Course C. It so happened that he was next to the last man up in the January test. No color would be safe under such a severe color vision deficiency. On the other hand, he would not have been out shooting at dusk had he not been



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CASE No. 628: \$58 a dozen neoprene gauntlets lasted 5 shifts washing appliance parts in kerosene-base solution. Less expensive *job-fitted* Edmont Grappler gauntlets wore 10 shifts . . . reduced glove costs 86%.

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These benefits of using *job-fitted* gloves are further increased by Edmont's *Extracoat* process — the controlled application of a thicker coating on the palm, with normal coating on the back to retain flexibility.

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Edmont
JOB-FITTED GLOVES

Circle Item No. 46—Reader Service Card

nonfluorescent yellow did not show well, possibly due to a lack of color contrast. In November fire orange and neon red were seen better than blaze orange and in January the fluorescent arc yellow showed best to the deutan observers. This demonstrates the reason that no one color can be best for all hunting conditions and all observers.

With so few observers, no attempt was made to chart the observations of the protanopes and deutanopes separately because there is always some difficulty in

grading the severity of color vision. No tritan (blue-yellow) deficient men were found. In comparing the results of this field experiment with other studies, it must be remembered that the fluorescent colors are much brighter than natural objects, even more so when the lighting was poor and also when the snow reflected extra energy into the fluorescent systems. A different set of color contrasts is involved in these field studies than would be found in many indoor laboratory experiments.

Opinions of the observers were recorded immediately after they completed Course A or B as to (1) which color was easiest to see, (2) most difficult to see, (3) appeared most artificial or least like natural objects, and (4) if they were to hunt deer which color they would prefer to wear for protection. To avoid any question of color names a numbered set of the colored vests was placed at the recording station and the men indicated which colors they were citing.

The summary of the answers is given in Figure 4. Blaze orange and neon red were reported easiest to see, plain yellow and red most difficult, blaze orange and neon red as both most unnatural appearing and preferred for self protection while deer hunting. The responses are about the same as the sightings for Course A, Figure 2.

The responses of the men with color vision deficiency are different. The order for the protans was: easiest to see—arc yellow, blaze orange, neon red, and fire orange; most difficult—red, neon red, yellow, and fire orange; most artificial—arc yellow, neon red, blaze orange, fire orange, and red; and preferred color for wear—arc yellow, blaze orange, fire orange, and neon red. One man rated the neon red as most difficult to see and also as his preferred color for protective wear, possibly considering concealment as the best protection.

The deutans gave the following data: easiest to see—arc yellow, fire orange, blaze orange, and red; most difficult—red, yellow, neon red, and fire orange; most artificial—arc yellow, neon red, blaze orange, and fire orange; preferred for wear—arc yellow and blaze orange.

Both red and green deficient red-green confusers found the orange arc yellow easy to see and in their belief a good color to wear for protection, with blaze orange the second choice. The neon red was reported as hard to see and with the exception noted above, not a choice for wear while hunting deer. The arc yellow was the brightest color as well as a hue that is known to be visible for partially color blind people with good lighting.

Course C was a forced-choice,

—To page 124

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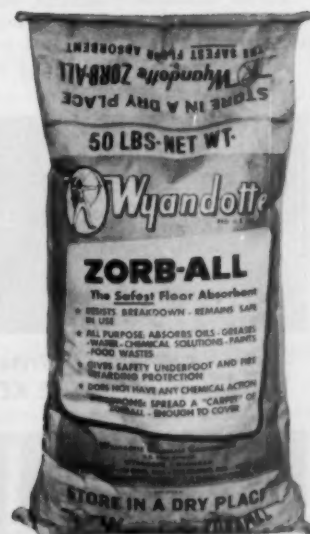
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J. B. FORD DIVISION

Forest Fires

—From page 25

quirements of fire fighting and other forest work. The unit is known as the Arcadia Equipment Development Center.

Located just east of Pasadena and Los Angeles, and just south of the Angeles National Forest where much of its testing is done, the Center is headed by E. E. Silva, as en-

gineer in charge. With the help of two dozen employees, including engineers, foresters, fire equipment specialists, clerks, mechanics, and engineering aids, he keeps dozens of tests going all the time on various types of equipment.

Commercial equipment from many well known suppliers is under test on every side. Often it is a performance and endurance test to determine whether the "thing" will stand up under continuous use and

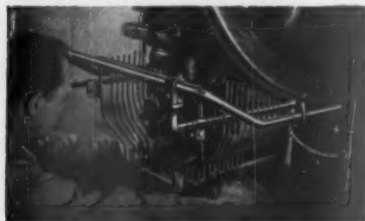


"Doghouse" permits observation of water drop pattern as air matches plane speed.

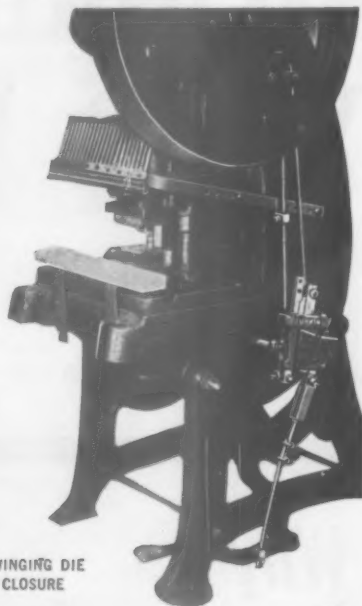
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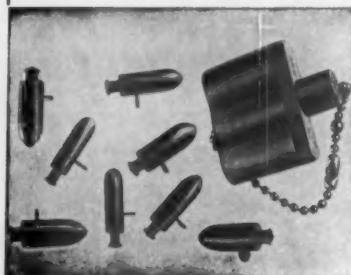
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SURGICAL MECHANICAL
RESEARCH INC.
1905 Beverly Blvd., L.A. 57, Calif.



Engineers on ground observe water drop by plane on basis of "doghouse" studies.

perform according to specifications for a certain number of hours.

When their boys are on the fire lines, they're taking no chances on equipment failure!

Other tests involve pressures, resistance to heat or cold or moisture, or spark retention, or many other variables. One display that caught our attention on a tour through the Center was a number of hose couplings that fractured under test. And it was amusing to learn that a cheap little motor-driven fire pump from a mail order house had turned in champion performance in tests of units of its type.

Testing of spark arresters for motor exhausts was just getting under way. Ever since photographic records of experiments at the University of California had proved the danger of ignition from exhaust sparks, demands for this kind of investigation had mounted. With an

assist from Art Spleiss, one of the developers of this type of protection, Charles Howard, an engineer at the Center, had designed an elaborate laboratory setup to measure every facet of engine exhaust and spark dispersion.

When commercial products cannot be found to meet a certain need,



Mr. WILLIAM B. WEBBER

A Tektronix Vice President, says:

"We are happy we chose *Employers Mutuals of Wausau* as the carrier of our workmen's compensation. We find they have a friendly and effective way of working with us and our people.

"Other reasons too: Because *Employers Mutuals* is a national company we can simplify records by taking care of our country-wide field offices and our plant at one time.

"Then there is the matter of savings—the dividend we can expect through *Employers Mutuals'* help in promoting safe working practices.

"The picture lower right shows one way this works. At the left is George Babich, an *Employers Mutuals'* Safety Engineer. Part of his work with us is as advisor to our employee safety committees. Shown here on a safety inspection tour are E. E. Ashenbrenner, manager of our Fabrication and Moulding Division; Norm Olson, Chairman of this safety committee; and Lois Addington, head nurse.

"They're good people, these *Employers Mutuals'* representatives. Good people to know, good people to do business with."

FOUND: "...AN INSURANCE COMPANY WITH OUR WAY OF WORKING"

Wausau Story

at **TEKTRONIX, Incorporated**
Portland, Oregon

THERE IS MUCH that is unique about Tektronix, Inc.—their products, plant, and philosophy.

The products developed and produced by this company are cathode-ray oscilloscopes. At the left, Mr. William B. Webber, a Tektronix Vice President, shows us some models of these electronic instruments. The Tektronix oscilloscope is recognized as a precision tool by scientists and engineers in such fields as atomic energy, medicine, radar and guided missiles. This tool provides "a picture of changing phenomena," accurately measuring voltage from hundreds of volts to less than a hundred thousandth of one volt and measuring time from minutes to a few billionths of a second.



The Tektronix plant is a group of attractive one and two story buildings, forming an industrial park in a pleasant Portland suburb. Each building is landscaped with flowering bushes and green lawns, an inviting place for outdoor lunches.

Tektronix people appreciate the philosophy that guides their way of working: "respect for the dignity of each individual." Here each person assumes responsibility, takes pride in a job well done. Typical is the work of Irene Sherrick in the Unit Wiring Department. Wiring and soldering a unit may take a few minutes or up to ten hours, depending on the complexity of the model. Today there are over 3000 employees.

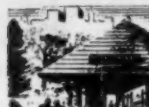
★ ★ ★

Why does a company choose one insurance company over another? The reasons vary—even though all workmen's compensation policies are basically the same. The difference is in the interpretation. At *Employers Mutuals* we interpret policies not by the law alone but also by principles and beliefs on which our company was founded. That's the "Wausau way of working."

Employers Mutuals of Wausau has offices all across the country. We write all forms of fire, group and casualty insurance (including automobile). In the field of workmen's compensation we are one of the largest. We are proud of our reputation for fast claim service and our experience in preventing accidents. Consult your telephone directory for the nearest representative or write us in Wausau, Wisconsin.



Employers Mutuals of Wausau



"Good people to do business with"

then the Center gets busy and creates something to fill the bill.

For instance, operating hazards of the rotary type of brush cutters started the search for a substitute. Elmer Hokanson, a forester at the Center, devised an entirely new type of timber tool—a "pole saw" that operates like a drill. The air-cooled motor, suspended in front of the operator by a shoulder harness, turns a 6-foot shaft that is tipped by a three-quarter-inch drill

bit. The tube that shields the drive-shaft ends in a metal arm that extends at a 45-degree angle from the drill. When this V-shaped device spans a sapling and pressure is applied by the operator, the fixed arm forces the wood against the moving bit, which fells the tree in seconds.

Since the Center is concerned with development—not manufacturing, such devices are turned over to private companies for fabrication. In this case, the McCul-

loch chain saw people agreed to produce the pole saw. They had provided the working models for the initial tests.

The Center has been an active partner in the development of "helitactics," a new concept in forest fire control by use of helicopters. In this connection, Center engineers helped develop the "helitank," a collapsible bag made of neoprene-coated nylon which can drop water or chemicals in a desired pattern at a critical point in the fire.

When laying of fire hose over rough terrain by helicopter was proved feasible, the Center developed a hose tray and worked out a method of loading it so 1,500 feet of fire hose could be placed accurately at speeds up to 20 miles an hour. This was the brainchild of

Circle Item No. 53—Reader Service Card

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"Stop The Shock"

Install SAF-T-BOOMS

"Saves Money and Lives"

Call, Write, Wire for Descriptive Brochures and Prices

JOHN H. FINNE

General Manager

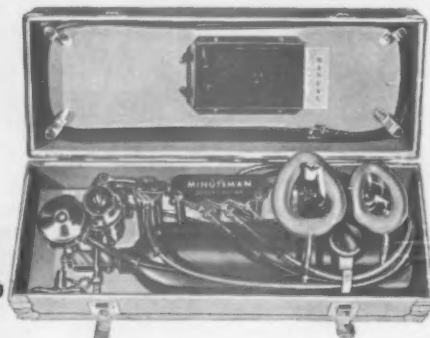
Saf-T-Boom Sales & Service, Inc.

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Little Rock, Arkansas

Somebody lives, because somebody else had a

MINUTEMAN RESUSCITATOR



You never know when you'll need a STEPHENSON MINUTEMAN — today, tomorrow, next month. Better assume you'll always need it, even though you may never use it. Regard it as 28 pounds* of prevention, worth tons of regret.

Although it is compact, 24½" x 8¾" x 7¾", the instrument combines the func-

tions of resuscitator, inhalator and aspirator. With an extra Midget attachment it will resuscitate 2 patients and aspirate a third simultaneously. Pressures are adjustable from Adult to Infant, with manual override when needed. Easily regulated to mixtures from 100% oxygen to 50% oxygen, 50% nitrogen from the air.

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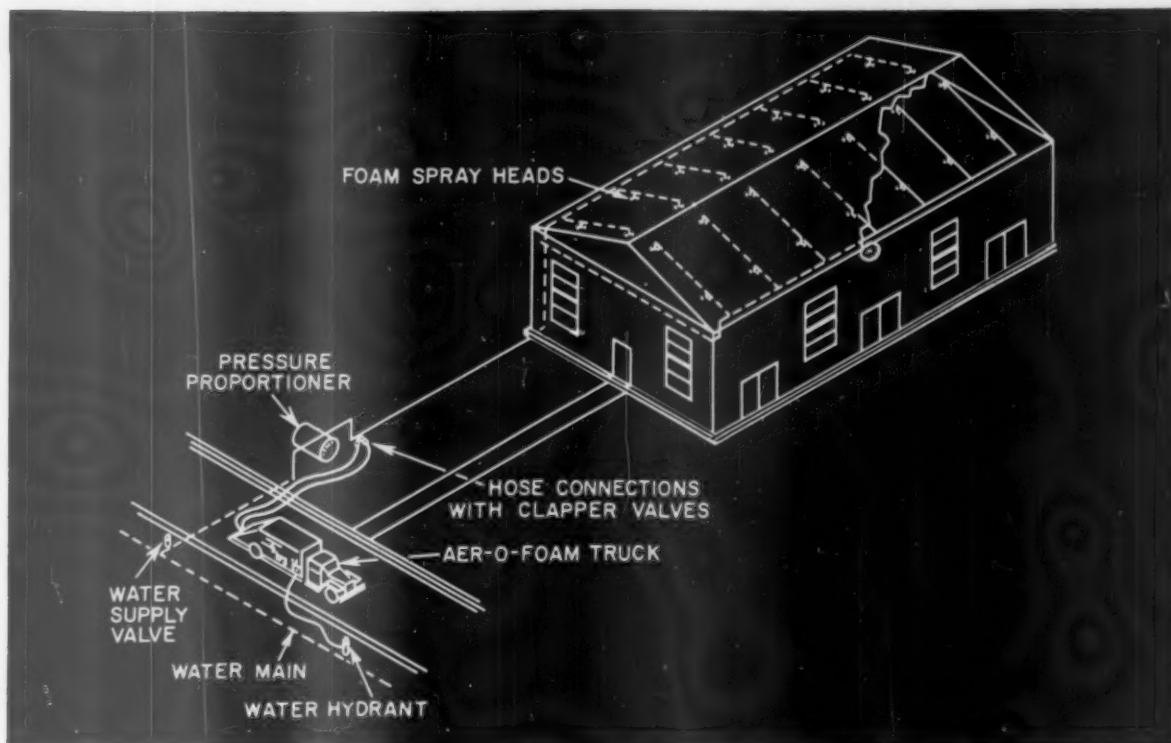


'Helitank' drops water in predetermined pattern as helicopter speeds fire attack.

Engineer Herb Shields. To feed such a fire hose, portable pumpers had already been developed by the Center.

Cooperating with other branches of the service, the Center has worked on various slurry mixtures of bentonite and other materials to test their fire retardant possibilities. Timber management officials also have used the Center's services in the development of pest control tools.

Airplanes were used for water drops in forest fire fighting long before the Center was established, but it remained for this group to work out the pattern control. Back of the spark arrester lab there's a dog-house type of building—on stilts. One wall is of glass and the inside of the opposite wall is marked off in small squares. The duct from a large blower connects to the right



HOW TO USE FOAM TRUCKS

to protect additional refinery areas—at low cost

Pump houses, manifold pits, pipe trenches and other "hot spots" in refineries often lack the fixed fire protection systems found on storage tanks.

This condition can be corrected, promptly and inexpensively, with systems such as that shown in this diagram of a typical pump house.

Overhead foam spray heads are connected with a single pipeline leading back to a water source. At a point in this line, a proportioner holds a supply of Aer-O-Foam Liquid sufficient to operate the system for perhaps ten minutes.

In the event of fire, the operator opens the valve, starting foam discharge in a matter of seconds. At the

same time, a foam truck is dispatched to the scene and hooks its discharge hose into the downstream side of the proportioner, providing ample foam liquid to operate until the fire is extinguished.

* * *

With every modern advance in design and construction, National Aer-O-Foam Trucks perform tasks like this efficiently and economically. These trucks are typical of National's contributions to better control of fire in flammable liquids.

National Foam System, Inc.

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Thirteen stock sizes fit hook necks ranging from $\frac{1}{4}$ through $3\frac{1}{4}$ in. Latches for larger necks available.

New Peerless **SAFETY LATCH** converts standard hooks to safety hooks in minutes

Make all hooks on your hoisting equipment safety hooks . . . convert them in minutes with simple tools and a Peerless Safety Latch. Made of sturdy corrosion-resistant materials and designed for long life.

The latch installed costs less than machining a conventional safety hook, can be applied to any make of hook on any type of hoist or sling, has finger lugs to protect hoist operator.

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Hand Chain Hoists (1/4 to 60 tons) • Electric Hoists (170 to 4000 lb.)
Trolley Hoists (1/4 to 12 tons) • I-Beam Trolleys (1/4 to 20 tons)

end, and the left end remains open.

This contraption simulates the conditions encountered in water drops from an airplane—air speed conditions and all—and measures the result. The design and arrangement of the device provided the Center's contribution to the fire fighters' demand for the best possible pattern for water drop.

Range of the Center's activities is almost beyond measure. Small items for the comfort and survival of foresters, like the taste-free water canteen made of plastic, and the expendable headlamps and water-activated batteries were found among the new developments in the labs, while in a field out in back were huge bulldozer blades that had been tested for endurance.

The work of the Center, of course, is valuable only insofar as its findings are put into practice. There must be a constant flow of information on new specifications and instructions for using the new gadgets and techniques in the forest. That's the job of Virgil Shoemaker, who writes and edits the Center's

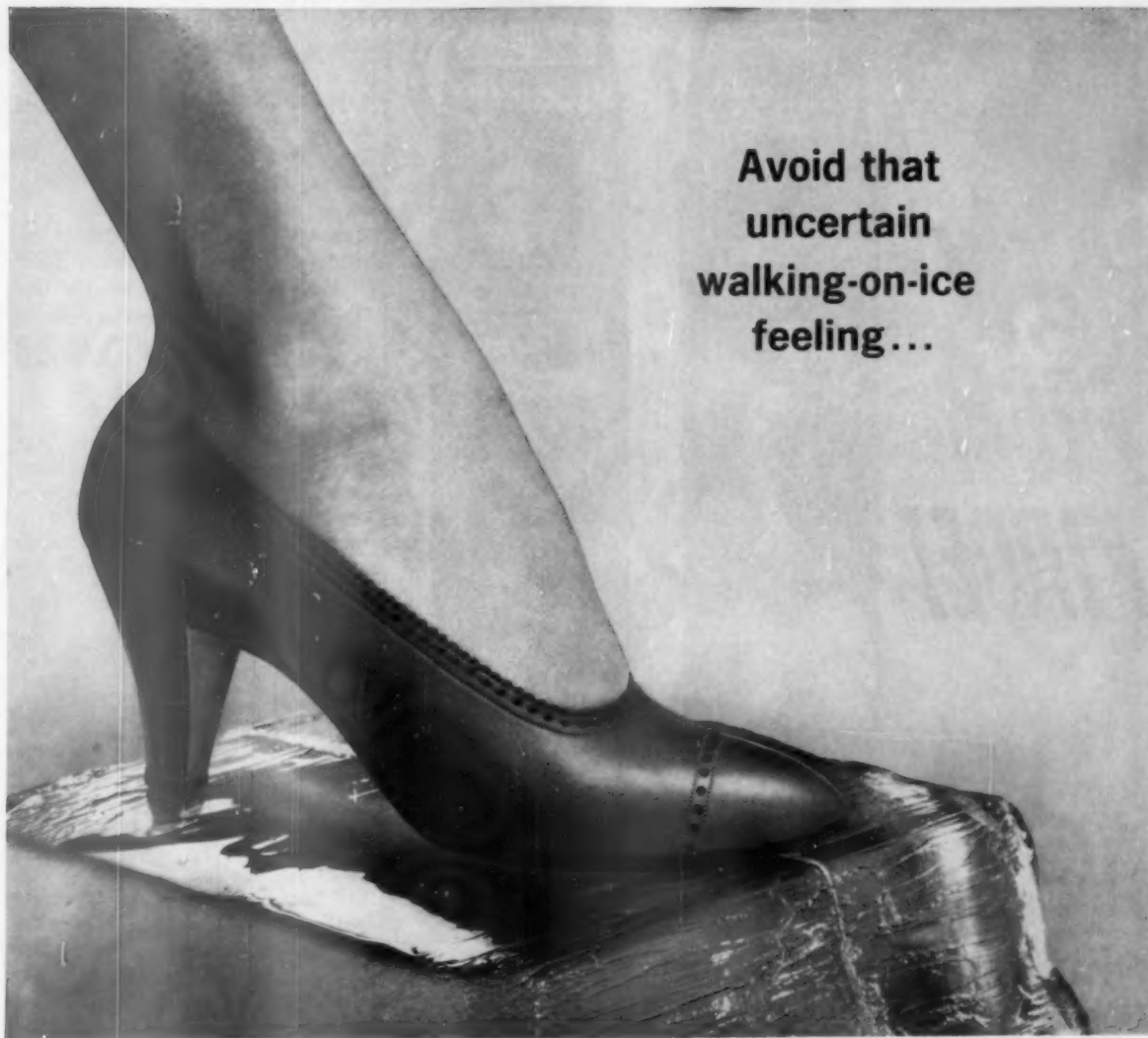


Center engineers designed this portable pumper which can be dropped anywhere by helicopter after hose-laying maneuver.

newsletter, *'Quip. Tips*, which circulates throughout the Forest Service.

Although the Center staff is small in number, and though, maybe, their appropriation isn't all they might want, they're not stumped by the size or strange nature of a request for help.

As long as the boys on the fire lines need new items of equipment to protect our forests, the Arcadia Center team will see that they get it.



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uncertain
walking-on-ice
feeling...

**For positive traction underfoot, plus lasting beauty,
use floor wax containing LUDOX—Du Pont's anti-slip ingredient**

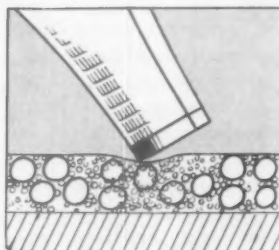
With "Ludox" in the floor wax you get added safety underfoot. "Ludox" acts like a brake that promotes easy, effortless walking. And you get the lasting beauty only a fine wax can give your floors. Scratches and scuffs can be buffed out

without rewaxing. For more information and a list of suppliers, write us or mail coupon below.



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In floor wax, microscopically small spheres of "Ludox" colloidal silica are mixed among larger wax globules. Under foot pressure the particles of "Ludox" bite into the softer wax globules, resulting in a snubbing action that makes walking more carefree and comfortable.

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2 1/2-gallon
pressurized water

2 1/2-gallon
anti-freeze loaded stream

The easiest-to-operate portable fire extinguishers on the market today!

Here, for the first time, is a practical, sensible design for pressurized water and loaded stream extinguishers. No inverting, no bumping, no valves to turn, no pins to pull (safety lock automatically releases when nozzle removed).

These two new stainless steel Kidde portables feature simple, one-two operation—just aim at fire and push the button. Notice the way the hose is stored, safely out of the way. Notice the wide-open handle—to insure fast action even in gloved hands. Notice the dust-and-waterproof pressure gauges—which show at a glance whether the units are fully charged. All of the features—plus the slim design and light weight of these Kidde portables—make them the easiest-to-store, easiest-to-carry, easiest-to-operate portables on the market today.

Approved by Underwriters' Laboratories. Available in pressurized water for fires in ordinary combustibles, or anti-freeze loaded stream for fires in ordinary combustibles and flammable liquids. For more information, write to Kidde today.

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The words 'Kidde', 'Lux', 'Lux-O-Matic'.

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Small Business, Associations

—From page 70

How to guide the discussion: Asking questions is a good device. To extend our metaphor, the question is like a cop's whistle. It signals us to move on. A question challenges thinking and imagination, inviting us to pursue a different facet of the problem. Or, when the discussion is "drifting to sea," you can remind the members in a friendly, yet firm, fashion that they should stay on the subject.

4. Discourage the Overly Aggressive. Usually there's a bulldozer on every committee. He's probably aware of his aggressiveness, though he plows under the other members and creates tension. As with the non-participant, the leader must be careful in dealing with the bulldozer. Yet he must be dealt with for the sake of the group.

If nothing is done about the overly-aggressive, democratic procedure soon is disrupted. The overly-aggressive person is a person who needs to be understood, rather than condemned. Giving him a position of responsibility, such as taking notes or heading a subcommittee, will help him fulfill his needs without sacrificing group democracy.

A more direct approach is to simply say, "I appreciate your views on the subject, but perhaps we should hear from someone else." Then shift the conversation to another willing member.

5. Prepare To Be Led Yourself. The test of a good leader is whether or not the committee can function without him. The common tendency (sometimes the fault of the chairman) of many committees is to let the chairman function as the committee. He presents the arguments, resolves the conflicts and implements the plans. When this happens, the purpose of group action is lost.

To guard against a committee-of-one, you must continually remind your group by word and deed that they are leaders, too. Each member has a responsibility in planning, and everyone has equal rights. Try to direct the conversation away from yourself.

Except in large meetings, re-

quiring people to address the chair in order to gain the floor inhibits free communication and focuses attention upon the chairman. As with government, the discussion leader who "governs least, governs best."

—Michael Daves,

The Tower,

Pulaski Heights Methodist Church, Little Rock, Ark.

Can Manufacturers Institute Receives Award

Dr. Earle S. Hannaford, NSC Vice-President for Industry, recently presented the 1960 NSC Associations Award to CMI's president, Roger F. Hopenstal.

Dr. Hannaford said: "To win such an honor once is a mark of high honor. But to win it seven consecutive years is more than that. It not only sets a precedent. It is an incentive and inspiration to others as well as a challenge to the future that bodes well for industrial safety.

"And this is of prime importance because, as pointed out by Secretary of Labor Mitchell, there will be 26 million newly-employed young people entering industry in the next decade, the Sixties—2,600,000 each year. Furthermore, he predicts a steadily worsening and rising industrial accident rate during those years, unless we in industry meet the challenge.

"Safety in these United States of ours has, from its beginning, been a voluntary effort on the part of industry, not a government-inspired and controlled venture, as in European countries. The National Safety Council is the outgrowth and manifestation of the strength and spirit of free enterprise.

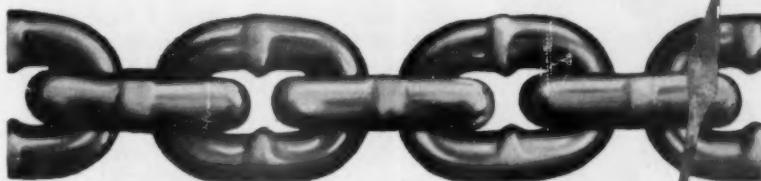
"Without your membership and participation in the Council and your facility and skill in interpreting and making safety a meaningful and compelling entity to and for your members, industrial safety would indeed be flying on one wing.

"It is with deepest appreciation and thanks that, on behalf of the National Safety Council, its Board of Directors and the Industrial Conference, I present this award—your seventh such award in as many years. I do this with our best wishes for the future—a future in which we look to you for continued leadership."

National Safety News, November, 1960

VALUED FOR THE

Long Haul



TM alloy slings

"Stamina for the long haul!" That's the frequent comment on the performance of TM Alloy Sling Chains in steel mills, foundries, forge shops, mines and countless other industries.

Bulletin 14A—packed with facts and specifications—gives you many reasons why TM Alloy Chain is valued by so many. Call your industrial distributor, steel warehouse, hardware wholesaler, or write today for your copy.

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Made
CHAIN SINCE 1873

Prompt repairs on alloy slings in both plants.

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Plants: Hammond, Indiana
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Circle Item No. 59—Reader Service Card

123

Safe ladders...

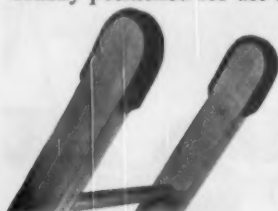
Save lives!

(600)



Slipping ladders cause more accidents... and result in more injuries... than any other single hazard, according to a recent survey by the Wisconsin Industrial Commission. This disgraceful fact is all the more disturbing because there is absolutely no excuse for most of these accidents. The simple inexpensive installation of Safe-Hi ladder shoes is your guarantee against accidents... which of course mean man hours lost, work stoppage, compensation. Ladder shoes eliminate both need and expense of second worker holding base of ladder.

Shoe tread construction of both neoprene and fibrous material gives maximum protection against ladder slipping on any industrial surface whether wet or dry, soapy, greasy or slick. Straight ridge design crosses line of slippage and acts as a series of squeegees in scraping off foreign substances thus insuring a good grip on any surface. Added feature is a self-sharpening spike which can be readily positioned for use in ice, snow or gravel.

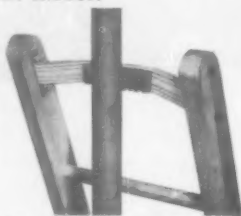


Safe-Hi Wall Grip (640)

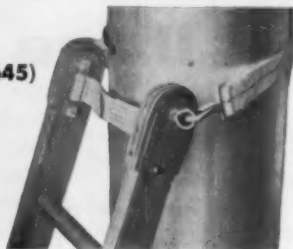
The Safe-Hi wall grip holds the top of the ladder securely on all smooth walls. Prevents side slipping and helps to hold the bottom of the ladder.

Safe-Hi Pole Grip (632)

The Safe-Hi pole grip holds top of ladder on any pole, pipe or corner. Fits any ladder. Helps prevent ladder tipping.



(645)



Safe-Hi Ladder Lash

The Safe-Hi ladder lash is quickly attached to any ladder. Strap made from 2800 lb. tensile strength parachute webbing with forged steel snap. Lash features quick adjustment slide that gives positive hold on pole.

Complete information on any Safe-Hi Safety equipment; write for free catalog.

Safe-Hi Safety Equipment is made by

rose manufacturing co.

RO-12

2700 W. BARBERRY PLACE • DENVER, COLORADO

—From page 114

much as a man would have in hunting. Of the 592 "deer" targets shot at, 13 were yellow, 4 each fire orange, arc yellow, and red and 1 blaze orange. One severe protanope, unable to distinguish the colors, shot at each, probably shooting at the movement of the targets. He was next to the last man to shoot in the January series. Deducting his score leaves 10 yellow and 2 fire orange, 3 arc yellow, and 1 red shot at. Both the yellow and fire orange hunter silhouette targets were shot at. The colored "deer" targets were shot with two exceptions after the average luminance of the target area was less than 4 ft.-L. One arc yellow was fired on at 4:30 p.m. with the target area average luminance at 20 ft.-L. Red, arc yellow, and yellow were fired on at 3.5 ft.-L. Most of the other colored "deer" were fired on at 1 ft.-L on less luminance.

The deficient, other than the protanope mentioned above, mostly did not shoot when they were unsure of a color and thus avoided making errors. Several men stated that yellow and arc yellow targets were difficult to see when the light was poor. The red targets just disappeared at dusk.

Summary by Colors

Red is not a suitable color for protective color for deer hunters because of less visibility than the other colors. Red was miscalled green, orange, pink, brown, black, dark or doubtful, and white, depending on the surroundings and lighting. Six times as many men voted for red as yellow (Figure 4), probably a result of associating red with danger, although both red and yellow were the least visible of the colors used.

The plain yellow cloth was less visible than red and appeared gray or white under poor light. This yellow was miscalled chartreuse, green-orange, pink, and white. Fewer yellow vests were seen by the deuterans, although the protans did well with

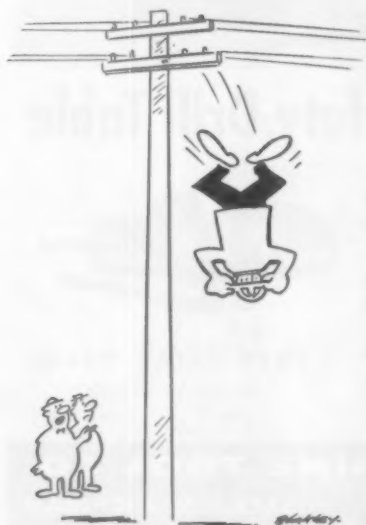
**Be a Responsible Citizen.
VOTE November 8.**

it in November. Four times more yellow "deer" were shot at on Course C than any other color. Also the yellow hunter silhouette was fired on during the October and January tests. This yellow is not a safe protective color for deer hunters.

The arc yellow is actually an orange. The sightings were poor against fall foliage and good with snow background. Arc yellow was miscalled green, crimson, red, and gray. The arc yellow "deer" were shot at on Course C. Being the brightest color used, it was a preferred choice for both the protans and the deutans for wear, even though their sightings of the targets do not support their opinions. As arc yellow turns white in poor light, it is too yellow for the best protection of white-tailed deer hunters.

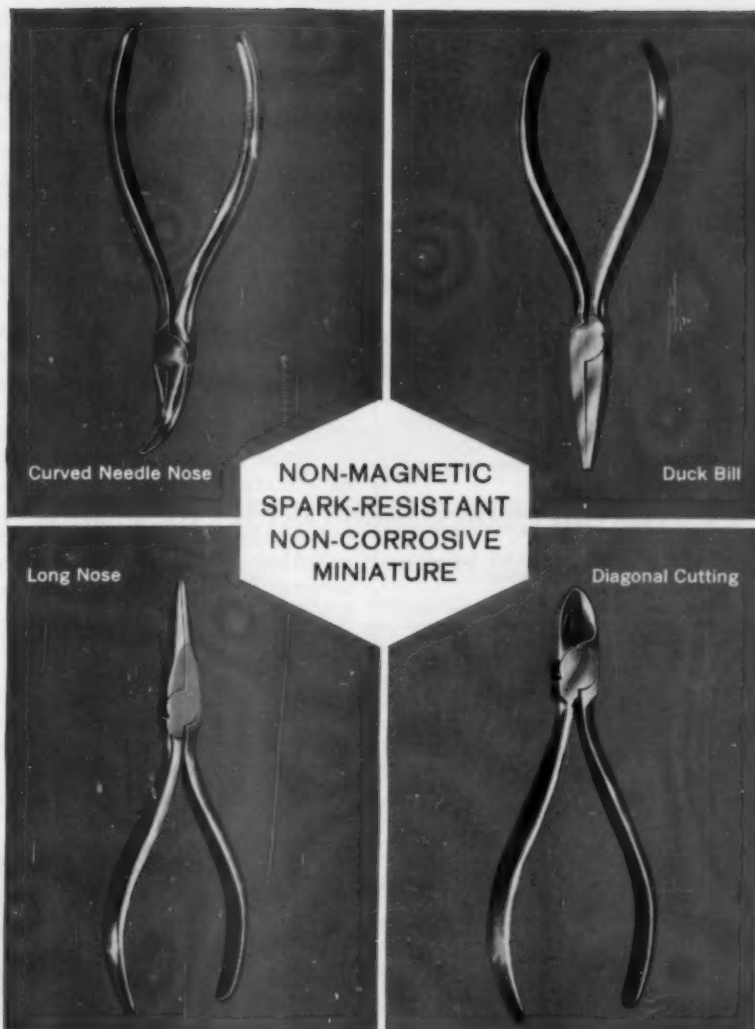
The fire orange was not seen very well against fall foliage and was only third best with snow. Both protans and deutans reported difficulty in seeing it and, with the exception of slightly better visibility for the deutans in November, it was not superior to blaze orange for the deficient. Fire orange was miscalled white, yellow, green, and black. The fire orange or rocket red used in 1958 turned attention to the fluorescent colors.

The neon red was second only to blaze orange for all observers. It becomes more conspicuous against snow for those people with normal



"Safety man. Field-tests the new hats."

National Safety News, November, 1960



Pliers shown are 1/2 actual size

STRONG, LIGHT AND SAFE FOR WORK ON SMALL COMPONENTS

BERYLCO miniature pliers and socket wrench sets are made from beryllium copper, a sturdy, lightweight alloy that is both non-magnetic and spark-resistant. BERYLCO tools safeguard delicate instrument adjustments, and are small enough to use on tiny electronic components. You get all these advantages with no sacrifice in strength, since BERYLCO tools need little or no increase of size to approach the strength of steel. Investigate the advantages of these unique safety tools by writing to Dept. 12, The Beryllium Corporation, for a complete catalog.



1/4" Square Wrench Socket Set



THE BERYLLIUM CORPORATION
Reading, Pennsylvania

Circle Item No. 61—Reader Service Card

125

Money-Saving facts about **EMERGENCY LIGHTING . . .**



FROM THE INVENTORS OF **EMERGENCY LIGHTS**

To get the best emergency lighting system for your money, you should be able to answer questions such as:

- What is it used for?
- How does it work?
- Are there different styles?
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- Where should the units be located?
- How are the units installed?
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Now get the facts about emergency lighting in a free booklet "How to Select Emergency Lighting". To select the system best for you — and save money too — mail this coupon today:



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Mail Northern Electric Company, Ltd.
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color vision, but not for men with defective color vision. It was the poorest color against colored fall foliage for the deutans. Both protans and deutans reported it was most difficult to see and only one chose it for wear while hunting, presumably because he thought it the least visible of the colors. Neon red was miscalled white, yellow and gray-black. It was generally considered the most unnatural color, due to its fluorescence being mainly red with a small amount of blue. The blue component may be how the protans see it.

The most conspicuous color is the blaze orange for normals and the protans, and it is second only to arc yellow for the deutans. It was called chartreuse, gold, pink, red, and white only once by a severely deficient individual. The first two color names are not errors, and none of the others could be confused with the color of a deer. With the exception of the November series when neon red was sighted more often, blaze orange had the best score of the colors used. Blaze orange was the second choice in the

opinion poll as to which color would be worn for hunting protection by the normals, but not by those with deficient color vision, although it received the most votes as the easiest color to see.

Final Recommendations

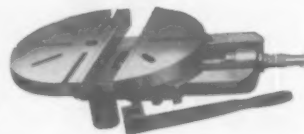
The objective of these field tests was to determine the color that would give the best protection in Massachusetts when worn by hunters of white-tailed deer. The fluorescent colors are more visible than the nonfluorescent yellow and red. An orange yellow, the arc yellow, was too yellow and failed to give protection at dawn or dusk, or in deep woods when the lighting was poor. Neon red was nearly as good as the blaze orange for men with normal color vision, but not for deficient, so it was eliminated. The redder fluorescents were less visible than the blaze orange.

The color for protection of deer hunters should have only a minimal tendency to turn white or gray and not be too red so as to handicap partially color blind hunters. A



USE THE **MODERN** Safety Drill Table

Saves fingers! Saves time! Replace your present drill table with the Modern Safety Drill Table—then drop in the work and drill. Eliminates dangerous, hand held, small jobs. Handles odd, irregular shapes and sizes without V-blocks, clamps or parallels. Sizes for every need, with diameters from 8" to 27½". Guaranteed to save its cost in labor alone in 6 months. Write for literature.



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105

MODERN MACHINE TOOL CO.
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Circle Item No. 63—Reader Service Card

study of the data shows that no single color can be superior for all people and all kinds of terrain, against fall-colored foliage, no leaves, or snow, and with adequate or dim lighting. Taking into consideration the sensitivity of the human eye and the information from these tests, the outstanding color for protective clothing of hunters must not be much yellower than the blaze orange used and no more red than necessary to give a reasonable manufacturing tolerance.

The recommended color shall have a dominant wave length between 595 and 605 μ , a luminance factor of not less than 50 per cent and an excitation purity of not less than 90 per cent (1). This specifies the daylight fluorescent orange recommended for consideration by the Legislature of Massachusetts for inclusion in the hunting law.

REFERENCES

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2. Graham, C. H., Y. Hsia, and G. G. Heath. 1960. "Luminosity Losses in Deuteranopes." *Science* 131:417-418.
3. Heinsen, A. C. 1958. "A Field Study of the Relative Visibility of Various Colors at Distances Up to 200 Yards." *Journal of the American Optometric Association*, 30:327-332.
4. Lahr, L. E., et al., 1959. "A Field Study of the Relative Visibility of Various Colors." *California Fish & Game* 45:203-215.
5. Ward, Richard A., Switzer Brothers, Cleveland 3, Ohio, Personal Communication. The measurement of fluorescents is described in "The 'Day-Glo' Daylight Fluorescent Color Specification System" by Mr. Ward. Published by Switzer Brothers, 1952, 38 pp. mimeo.



"Somebody up there likes me!"

NEW!



LIGHT—only 5½ ozs.
FITS ALL SIZES—either foot
SLIPS ON EASILY—stays put

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gives added safety, deflects falling objects

Worn with safety toe shoes, this new lightweight metatarsal foot protector affords full coverage of wearer's instep to guard against blows from falling objects. Comfortable to wear, ruggedly constructed, protector has tough outer shell of flame-resistant plastic over an aluminum plate sandwiched between two ½" layers of vinyl plastic. Steel spring slips on heel quickly, keeps unit firmly in place without restricting foot movement. Write for details and prices.

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Model 1450

King Arthur claims:

*"I don't jest when I joust,
no foolin'*

Dockson

HELMETS

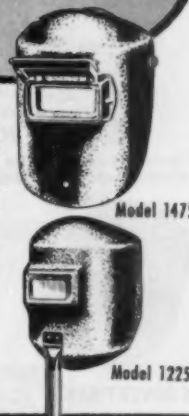
*are ye best for protection
and comfort."*

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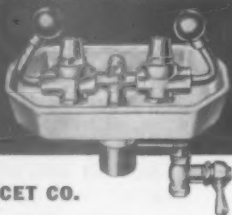


IN EMERGENCY... contaminated eyes are instantly cleansed of dangerous particles and chemicals by *controlled* water streams from HAWS Emergency Eye-Wash Fountains. This "split second safety" before medical aid arrives can mean the difference between temporary eye irritation and permanent eye injury! HAWS will provide emergency facilities best suited for your safety program—minimizing hazards, reducing claims, lowering insurance costs. Get the facts by writing today for illustrated literature!

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Calendar Contest For August



A red hand and red face Mary's got,
For that pan in the oven was hot!
She used no pot holder,
Though hubby had told 'er

Edward A. Coleburn of the Virginia Department of Highways, Richmond, Va., won the \$100 first prize in the National Safety Council's Safety Limerick contest with this line:

"If you can't **HAN**dle right, **HAN**-dle not!"

The contest appears monthly on the back pages of the Council's calendar. The theme for the August contest was "Use Protective Equipment."

Second prize of \$50 went to Miss Laura Penn, Fort Wayne Metals, Inc., Fort Wayne, Ind. Her entry was:

"Take-home shop rules can save wives a lot."

Mrs. Ervin L. Burmeister (Individual Member), Madison, Wis., won third prize of \$25 for this suggestion:

"For safety, little **'THINKS'** mean a lot!"

The 30 winners of \$5 prizes are: Mrs. P. D. Forte (Individual Member), Monongah, W. Va.

Mrs. Blanche H. Stair (Individual Member), Merritt Island, Fla.

Allan Sherwin, Inland Empire Paper Co., Millwood, Wash.

Miss Diane Bullock (Individual Member), New Brunswick, N.J.

W. H. Jamieson, Kaiser Steel Corp., Fontana, Calif.

Mrs. Helen Prussak (Individual Member), Wautoma, Wis.

Miss Cora Weaver (Individual Member), Van Buren, Ark.

Mrs. Sidney R. Bivins, Terrell State Hospital, Terrell, Tex.

Mrs. C. R. Wood (Individual Member), Morris, Okla.

Miss Mary Johnson, R.N., American Brake Shoe Co., St. Louis, Mo.

A. C. Cline (Individual Member), Seattle, Wash.

Mrs. C. D. Conrad (Individual Member), North Hollywood, Calif.

Bob Mason, Packaging Corporation of America, Seville, Ohio.

Ernest M. Zaiser, The Atlantic Refining Co., Philadelphia, Pa.

John B. Cobb, Standard Oil Co. (Ind.), Independence, Mo.

Miss Mildred L. Zimmerman (Individual Member), Santa Clara, Calif.

Rudy Kvasnica, Miller Brewing Co., Milwaukee, Wis.

Mrs. L. W. Silverthorne (Individual Member), Wichita, Kan.

Warren Keller, Illinois Power Co., Belleville, Ill.

Miss Dorothy DeLay, David Berdon & Co., New York, N.Y.

Mrs. Hazel Morton, c/o Dr. Robert Newman, Knoxville, Tenn.

Miss Norene M. Olson, Minnesota State Department of Education, St. Paul, Minn.

Mrs. Roy Schaefer (Individual Member), Payne, Ohio.

Miss Bernice Tucker (Individual Member), Kansas City, Mo.

Albert L. Fulk, Rohr Aircraft, Riverside, Calif.

Mrs. H. W. Guenther (Individual Member), Tahlequah, Okla.

Bernard Foley, Standard Engineering Co., Washington 15, D.C.

Mrs. Ben Goddard, B. F. Goodrich Co., Kansas City, Kan.

Mrs. Ray Diekman (Individual Member), Normandy, Mo.

Joseph H. Cameron, Worcester County Electric Co., Worcester, Mass.

Around the Compass

—From page 29

the American Society of Safety Engineers. Owners, managers, foremen and other supervisors discussed safety methods related to their industries.

Sacramento Starts "The Safetygram"

A new safety publication, *The Safetygram*, has appeared under auspices of the Sacramento (Calif.) Safety Council. It will appear at least once a month, covering news of traffic, home, industrial, farm, and other safety programs. The first issue opens with a criticism of the 66 traffic deaths suffered in Sacramento County so far this year.

Pavlinksi Joins Wisconsin Council

New assistant executive director of the Wisconsin Council of Safety, Inc., is Lawrence Pavlinksi, of the



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Enclosures,
Containers,
Guards, etc.**

...with ACROFLEX, the pliable notched steel strapping

You'll find ACROFLEX as handy to have around your plant as nails and wire. ACROFLEX comes in 10 ft. lengths and can be bent by hand to conform to practically any shape needed. Illustrated above are only a few of the many possible uses of ACROFLEX.

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BLOWERS**



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SAMPLE AIR FASTER, MORE ACCURATELY, PORTABLY

Accurate to
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INDISPENSABLE for series or unit air sampling—indoors or out. Portable, yet stands up to heaviest usage. Weighs only 10 lbs. Comes equipped with standard 4" filter holder. Special adapters available for 6" x 9"; 8" x 10"; 12" x 12" and others.

Staplex Air Samplers are widely used to solve the many diverse, exacting needs of leading industries. Also for industrial hygiene and health departments, nuclear and missile fields; manufacture and processing of beryllium products, radioactive materials and all other industrial dusts and air pollutants.

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THIS REMARKABLY SIMPLIFIED INSTRUMENT INDICATES CARBON MONOXIDE PERCENT IN THE AIR SAMPLE TESTED BY MEASUREMENT OF CO-STAIN IN THE INDICATING TUBE.

- ✓ Requires no color matching — is independent of operator's color perceptiveness.
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Range:
10 to 2000 PARTS CO per
MILLION PARTS OF AIR
(0.001% to 0.2%
CARBON MONOXIDE)

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Send me a copy of MONOXOR CO Indicator LEAFLET 890A

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COMPANY _____
STREET _____
CITY AND STATE _____

State Motor Vehicle Department, Enforcement Division. He has been a lieutenant in charge of the Eau Claire office. He will assist R. W. Gillette, executive director of the state citizens' council, in general administration and will work in field service for expanding programs.

Iowa AFL-CIO Endorses NSC-Union Cooperation

In Iowa the AFL-CIO state convention adopted an official resolution, endorsing affiliation of local unions with the National Safety Council and recommending a state safety committee.

Wisconsin Council States Statewide Meeting

The Wisconsin Council of Safety will hold a statewide traffic safety conference at the Plankinton House in Milwaukee, February 2-3. It will run concurrently with the council's annual mid-winter conference.

Mines Cut Roof Falls 26 Per Cent

A 26 per cent reduction in the frequency rate of injuries caused by falls of roof, face or rib has been achieved during the first six months of the 1960 coal mine roof fall campaign.

This rate reduction represents prevention of 223 chargeable injuries, 21 of which would have been fatal. The goal of the campaign is reduction of 50 per cent or more in the frequency rate of chargeable injuries caused by roof falls.

These results reflect efforts by participating mines that submitted base reports covering one of the three years 1957, '58, and '59 prior to the campaign, and includes injury experience from January 1 to June 30, 1960. The frequency reduction is the difference between the totals of these two sets of reports.

Awards will be given by the National Safety Council to mines, supervisors, local unions, and union safety committee men who achieve the campaign goal and meet other requirements. All underground coal mines were invited to take part. Enrollments closed July 1, 1960.

Harriman Awards To 14 Railroads

Atlantic Coast Line, Chicago & Eastern Illinois, and Canadian Pacific Lines in Maine are recent recipients of the E. H. Harriman Award gold medals for establishing the best safety records in their classifications during 1959.

Atlantic Coast Line Railroad Company, including its affiliate, the Charleston & Western Carolina Railway, received the gold medal for Group A, representing lines with 15,000,000 or more locomotive miles. Gold medal for Group



W. Thomas Rice, president of the Atlantic Coast Line Railroad and a member of the National Safety Council's Board of Directors, receives the Harriman Award from James G. Lyne, editor of *Railway Age* and chairman of the awards committee.

B, composed of roads operating 3,000,000 to 15,000,000 locomotive miles, went to Chicago & Eastern Illinois. The Group C medal went to Canadian Pacific Lines in Maine, representing carriers with 200,000 to 3,000,000 miles.

Certificates of Commendation in

SAFETY DIRECTOR

Seeks employment in Latin-America. College graduate. Experienced in planning, developing, and obtaining acceptance and support for complete accident prevention. Presently employed Latin-America. For resume or interview address Box 466 *National Safety News*.

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**WITH HOLT
EXPLOSION
PROOF
COMMANDER**

Model EPC16D,
showing handle
in space-saving
stowaway position.

Holt Commander is designed expressly for safe maintenance of floors in oil refineries, atomic research plants, powder factories, and other hazardous industries. There's no outside wiring. Entire unit, from brush to handgrip, is constructed, sealed and safety-tested to prevent sparks and static that might ignite gas, dust, fumes or vapors. Static eliminator wire in brush, a Holt exclusive, even prevents shocks to operator.

With this one machine and Holt Quick-Change Attachments you do a complete floor maintenance job—polish, wax, buff, scrub, etc. Dual handles give operator better control; reduce fatigue. Made in 16 and 20" sizes. For full story write now to Dept. W-11.

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BETTER FLOOR MACHINES
FOR MORE THAN 30 YEARS

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End Terrazzo and Marble cleaning problems with...



MYCOTRAZ

...Specializes
in the tough
jobs!



MYCOTRAZ combines, in paste form, the purest vegetable soaps and light abrasives, for completely harmless terrazzo and marble cleaning. Outstanding as an extra-heavy-duty cleaner for excessive dirt and wax pile-ups on all types of flooring. Renovates floors like a good honing, leaves them safer, more slip-resistant. Use with scrubbing brush, machine or as poultice . . . and throw away your harsh chemicals!

Let Mike O
clean up for you!

Write for
information



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OFFICES IN PRINCIPAL CITIES

each group went to these Class I lines: Group A—East, Erie; South, Illinois Central; West, Northern Pacific. Group B—East, Lehigh Valley; South, Central of Georgia; West, Denver & Rio Grande Western. Group C—East, Monogahela Railway; South, Clinchfield Railroad; West, Texas Mexican Railway.

In addition to the long-haul railroads, two switching and terminal companies also received certificates. Winners in this group were Baltimore & Ohio Chicago Terminal Railroad, representing larger companies, and the Kentucky & Indiana Terminal Company, representing smaller terminal roads.

The awards were presented at a dinner at the Hotel Roosevelt in New York, September 14. Medals and certificates were presented to representatives of winning roads by James G. Lyne, editor of *Railway Age* and chairman of the Harriman Awards Committee. Paul F. Stricker, managing director of the American Museum of Safety, is secretary of the awards committee.

The awards were established in 1913 by the late Mrs. Mary W. Harriman in memory of her husband, a railroad pioneer. Interstate Commerce Commission statistics are used to determine railroads with the best over-all safety records for each year. Safety ratings include casualties to passengers on trains and in train-service accidents and casualties to employees on duty in train, train-service and non-train accidents.

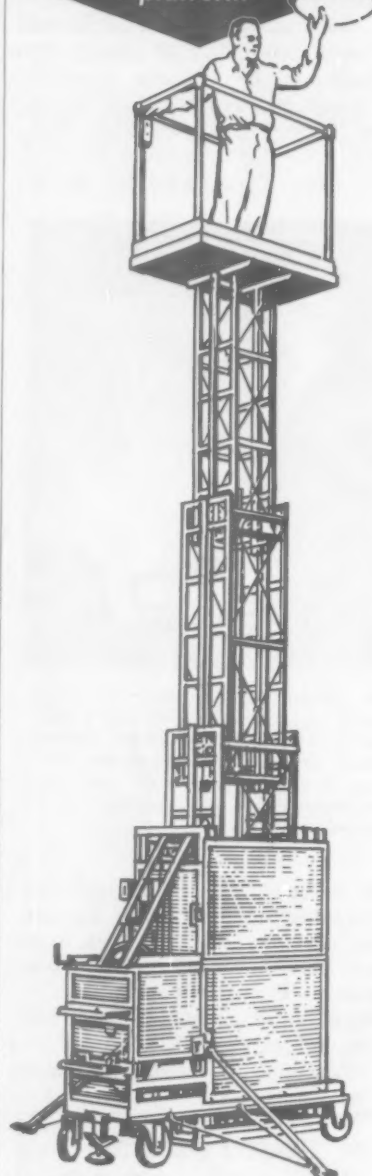
Gold medals are awarded only to Class I roads that carry both passengers and freight and have at least 100,000 or more passenger-miles of service.

Chemical Industry Workshop

A Chemical Industry Safety Workshop, arranged by the general safety committee of the Manufacturing Chemists' Assn., in cooperation with the West Virginia Manufacturers Assn., will be held at 10 a.m., November 9 at the Daniel Boone Hotel, Charleston, W. Va.

The workshop has two objectives: (1) to make closer contact with chemical safety engineers of the district and learn more of mutual problems, and (2) to contact, in particular, the small plant safety engineer.

Complete Safety
with a
HI-REACH TELESCOPER
Fast work with all tools
and materials on the
platform



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Lift 10'9"—\$370.00

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Custom built Hi-Reach Telescopes up to 100 ft.

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Watch this space each month for late news on NSC services. Use the handy Order Form to request sample copies of publications listed in this issue or to order safety merchandise.

NOVEMBER
1960



The Big Payoff

"What's all the noise about safety?" That's the question posed in this provocative 12-page booklet. The answers are convincing. Colorful cartoon illustrations make the many facts about safety programs "easy-to-take." Finally the booklet tells what the "big payoff" is; it is the reward for working safely on and off the job. "Sure, safety helps the company too," the booklet says, "but companies don't lose their eyes or fingers. They sometimes can make up money losses. Can you?" "The Big Payoff" is an attractive, impressive new employee training booklet and will serve as an effective attitude-builder.

192.16. *The Big Payoff* (minimum order 50 copies) each: 50—\$.07; 500—\$.08; 1000—\$.07; 5,000—\$.063; 10,000—\$.058; 20,000—\$.055.

Men and Motives in Safety Supervision

Safety men agree that the path to employee safety is the "foreman road." Foremen and supervisors are in direct touch with the men; they can observe, teach, correct and counsel. But before they can help make their men safety-wise, they have to understand what makes them tick. These six booklets, written in an easy, understandable style, teach the foremen how to understand people. They were written by Glenn Griffin, for many years the director of industrial training for the National Safety Council and now a leading consultant in training and safety. The *Men and Motives* series is a notable addition to the collection of supervisory material available from the Council.

151.07. *Men and Motives in Safety Supervision*. (Set of 6) Prices per set, each: 1—\$2.00; 2—\$1.60; 10—\$1.20; 100—\$.80.



Seat Belts Save Lives

Once a controversial subject, seat belts have been proved the most effective item of protective equipment now available to reduce deaths and critical injuries as a result of motor vehicle accidents. This booklet, *Seat Belts Save Lives*, tells the seat belt story, simply, clearly and convincingly. Attractively illustrated and designed, it should appeal to the better judgment of motor vehicle drivers who want to improve their chances of surviving traffic crashes, without serious injury.

399.31. *Seat Belts Save Lives* (minimum order 50 copies) each: 50—\$.06; 500—\$.05; 1000—\$.045; 5,000—\$.04; 10,000—\$.035; 20,000—\$.032; 50,000—\$.029; 100,000—\$.026; 500,000—\$.023; 1,000,000—\$.021.



USE TEAR-OUT FORM ON FOLD-OUT PAGE TO ORDER COPIES OF THESE PUBLICATIONS



New

POSTERS

Colorful safety posters give *visual impact* to your safety program. Eye-catching art-work and short, to-the-point captions, give these safety messages repeated readership. Seen and read dozens of times by each employee, they hammer home the importance of safety on the job. Poster subjects are related to actual accident experience. They point-up accident causes, means of prevention and general safety rules to be followed. These National Safety Council posters have proven highly efficient and effective in accident prevention programs.

POSTER PRICES*

SAFETY POSTERS, except traffic

	2	10	100	1,000	5,000
1	10	95	999	4,999	9,999
Series "A"	\$1.12	\$1.07	\$1.06	\$1.05
Series "B"	23	195	155	12

TRAFFIC POSTERS, Prefix "T"

	12	20	24	28	32
1	20	165	132	11	20
Series "A"	12	20	24	28
Series "B"	20	165	132	11
Series "C"	\$1.40	\$1.40	30	24

*National Safety Council Members receive 10% discount on these prices. Quantity prices apply only on a single shipment to one location. Please enclose check or cash with orders less than \$3.00. Prices subject to change without notice.

SAFETY
is always in
SEASON



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© NATIONAL SAFETY COUNCIL

1909-A

8½" x 11½"

FIRES
DON'T
START



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© NATIONAL SAFETY COUNCIL

1751-A

8½" x 11½"

ELIMINATE
A HAZARD



AND
PREVENT AN ACCIDENT

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© NATIONAL SAFETY COUNCIL

1799-A

8½" x 11½"

LOOSE CLOTHING IS
DANGEROUS, Bud!



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2018-A

8½" x 11½"

NO EYE
PROTECTION
NO EYE



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1829-B

17" x 23"

THAT'S THE SIGN
I DIDN'T BELIEVE!



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© NATIONAL SAFETY COUNCIL

1894-B

17" x 23"

CAREFUL!

Keep Hands
AWAY FROM
MOVING PARTS

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© NATIONAL SAFETY COUNCIL

1955-A 8½" x 11½"

**AVOID A
SCALD**

LID
AWAY

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© NATIONAL SAFETY COUNCIL

1841-A 8½" x 11½"

**LOST
TEMPERS
cause
ACCIDENTS**

next time **SMILE!**

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V-2014-A 8½" x 11½"

**YOUR TARGET
FOR SAFETY!**

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V-2013-B 17" x 23"

CHECK FIRST!

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1878-B 17" x 23"

**YOU'RE SAFER
WITH BELT BELTS**

SPREAD THE WORD

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T-2031-B 17" x 23"

H

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185

IN

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V-20

T-2029-C

T-2030-A

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HORSEPLAY CAUSES ACCIDENTS



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1854-A

8½" x 11½"



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V-2012-B

17" x 23"



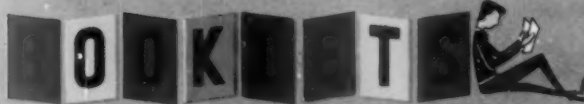
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T-2029-C
T-2030-A

25" x 38"

8½" x 11½"

SEND FOR FREE SAMPLE COPIES OF EMPLOYEE TRAINING



Employee education booklets are a basic part of your safety program. The National Safety Council publishes a wide variety of such booklets designed to shape sound safety attitudes or instruct your employees in the safe practices related to their work or off-the-job activities. Several recent booklets are described below. Sample copies of these booklets may be obtained by circling the code number on the order form or they can be ordered in quantity for prices shown.

OPEN BEFORE CHRISTMAS

A colorfully printed four-page booklet in bright holiday colors die-cut into the shape of a gay Christmas package. Its contents are intended to serve as a reminder that the holiday season can become a time of tragedy for families when loved ones are involved in traffic accidents. Size: 6" x 3".

STOCK NO. 399.43—(sold in packages of 100) Cost per package: 1—\$2.40; 10—\$1.55; 50—\$1.20; 100—\$1.10; 200—\$1.00; 1,000—\$0.97; 2,000—\$0.95.

BE A WINTER WINNER

A new 16-page booklet, printed in attractive two colors, discusses winter driving hazards. Explains how to drive safely in spite of such hazards as determined in the most recent tests conducted by the National Safety Council's Committee on Winter Driving Hazards.

STOCK NO. 399.59—Cost per booklet: 50—\$0.065; 500—\$0.055; 1,000—\$0.050; 5,000—\$0.040; 10,000—\$0.037; 20,000—\$0.035.

KEEP ROLLING WITH SAFETY IN WINTER WEATHER

Special edition of the winter driving hazards booklet for tractor-trailer and other commercial vehicle drivers, discusses technical problems of the professional driver of heavy equipment. Many charts and schematic drawings. Sixteen pages, 5½" x 8½", two color.

STOCK NO. 399.58—Cost per booklet: 10—\$0.17; 50—\$0.10; 500—\$0.085; 1,000—\$0.075; 5,000—\$0.065; 10,000—\$0.06.

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This booklet tells the seat belt story, simply, clearly and convincingly. 8 pages, attractively illustrated, it should appeal to the better judgment of motor vehicle drivers who want to improve their chances of surviving accident crashes.

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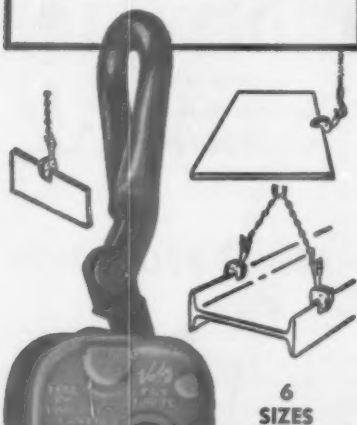
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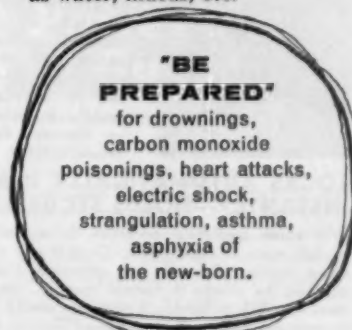
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—From page 64

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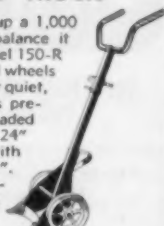
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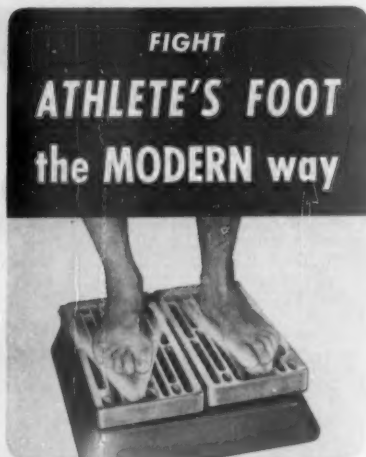


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- **Maximum protection** against Athlete's Foot—with individual, undiluted applications of SANI-MIST solution—in just 30 seconds.

- **Inviting to use.** Cool, refreshing SANI-MIST is clean and personal.

- **Minimum maintenance.** No mixing of solutions. A few minutes under a hot shower keeps the SANI-MISTER sparkling clean and inviting.

- **No time out for repairs.** The reliable, durable SANI-MISTER is made of stainless steel and aluminum, to take plenty of traffic.

The low-cost SANI-MIST method is used in thousands of industrial plants, schools and country clubs. Use the coupon below to find out what it can do for you:

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INC.

Dept. NSN, 3018 Market Street
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Please send us

— **FREE sample of SANI-MIST Solution**

— **Complete details on this unique method**

Company _____

Address _____

City _____ State _____

Your Name _____

COMING EVENTS



in safety and related fields

Nov. 9, Fort Worth, Texas

Sixteenth Annual Industrial Institute (Hotel Texas). L. W. Graff, safety director, Fort Worth Safety Council, Fort Worth 2, Texas.

Feb. 2-3, Milwaukee, Wis.

Nineteenth Annual Mid-Winter Safety Conference and Exposition, Wisconsin Council of Safety, Inc. (Hotel Schroeder.) R. W. Gillette, executive director, Wisconsin Council of Safety, Inc., 1 West Wilson St., Room 234, Madison 2, Wis.

Mar. 5-7, Atlanta, Ga.

Southern Safety Conference & Exposition (Atlanta Biltmore Hotel). W. L. Groth, executive director, PO Box 8927, Richmond 25, Va.

Mar. 14-15, Fort Wayne, Ind.

1961 Northeastern Indiana Safety Conference and Exhibit. Ivan A. Martin, manager, Fort Wayne Safety Council, Chamber of Commerce Building, Fort Wayne, Ind.

Mar. 28-30, Los Angeles, Calif.

Eighth Annual Western Safety Congress and Exhibits (Ambassador Hotel). Joseph M. Kaplan, manager, Greater Los Angeles Chapter—NSC, 3388 W. Eighth St., Los Angeles 5.

April 3-4, Boston, Mass.

Fortieth Annual Massachusetts Safety Conference and Exhibit (Hotel Statler Hilton). Sponsored by Massachusetts Safety Council, Safety Council of Western Massachusetts, and Worcester County Safety Council. Bert Harmon, manager, Massachusetts Safety Council, 54 Devonshire St., Boston 2.

April 12-14, Gainesville, Fla.

Eighth Annual Conference on Accident Prevention Engineering (University of Florida). Donald B. Wilcox, conference coordinator, College of Engineering, Department of Industrial Engineering, University of Florida, Gainesville, Fla.

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BLOCK THAT WHEEL!



Hold heavy trucks and trailers securely with ease. Prevent accidents caused by vehicle moving away from dock while loading or unloading. Safety Wheel Blocks are rugged, strong and practically indestructible, because they're STEEL CASTINGS. Easy to handle, Safety Wheel Blocks are your best insurance against costly accidents.

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FOB Hammond, Indiana

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1626 SUMMER STREET • HAMMOND, INDIANA

Safety Plug Lock

NEW ELECTRICAL SAFETY DEVICE PREVENTS COSTLY DAMAGE!

Protects children from possible harm. Eliminates accidental disconnecting of refrigerator, freezer (and consequent food spoilage), appliances, any electrical apparatus that plugs in. Locks plug into outlet, keeps it secure. Prevents shorts due to partial contact. Installs easily in a moment, adjusts for any size plug. Best insurance you can get. For homes, offices, stores, factories. Buy one for each outlet. Dealer inquiries invited.



3 for \$1.25—6 for \$2.00

Bulk Quantity Prices

100 to 500 27¢ each
500 to 1000 25¢ each

SAFETY PLUG-LOCK CORP.

1270 Broadway
New York 1, N.Y.

New SAFETY EQUIPMENT

Product announcements in this section are reviewed for compliance with the advertising policy of the NATIONAL SAFETY NEWS. Inclusion should not, however, be construed as endorsement or approval by the National Safety Council.



Safety Hat Liners Have No-Metal Design

Six new safety hat winter liners are now available from Jackson Products, Air Reduction Sales Co., 31739 Mound Road, Warren, Mich. Designed for outdoor industrial activities, these liners are offered in a range of styles.

These liners fit all hats and workers, and feature lightweight durable materials for warmth and ease of washing. The metal-free design of these liners permits their use by workers exposed to electrical shock hazards.

Styles include Model FC-2 with $\frac{3}{8}$ -in. deep all-orton pile lining and Model FC-4 which features a removable ear flap that attaches to a cap with a plastic zipper.

Jackson Products, Air Reduction Sales Co., 31739 Mound Road, Warren, Michigan (Item 301)



Industrial Wiper Dispenser

The Kraft-board disposable dispenser is positioned by an adhesive backing. There are eyelets, if desired. The MAGIC WIPER is a lint-free paper with high

wet strength.

The Silicone Paper Co. of America, Inc., 230 Park Avenue, New York 17, N. Y. (Item 302)

One-Man Unit Produces Foam in Seconds

A unit with a foam capacity of 600 gal. per minute, designed for first aid fire-fighting in plants handling flammable liquids, is now available.

The Aer-O-Foam Station, operated by one man, produces foam in quantities adequate to fight sizable fires up to 30 minutes . . . or long enough for heavy-duty foam trucks and other foam equipment to be brought into action.

East station consists of a steel cradle, a 55-gal. supply of Aer-O-Foam liquid, an Aer-O-Foam line proportioner and an RP-6A nozzle connected with 100 ft. or 150 ft. of $1\frac{1}{2}$ -in. hose. It can be installed by piping

the inlet to a source of water at suitable pressure.

To start fire-fighting action, the operator removes the canvas cover, strips out the hose, inserts the pickup tube in the vent in the top of the tank, and opens the water valve. Foam begins flowing in seconds—125 lbs. of water pressure provides a foam stream up to 50 ft. long.

National Foam System, Inc., West Chester, Pa. (Item 303)



Lineman's Safety Strap

A linemen's safety strap, with abrasion resistance and flexibility, has been introduced. The strap is made of six-ply nylon material, vulcanized for adhesion.

Four outer plies are black. Two inner plies are red. The inner red plies will emerge as

the outer plies are worn and, serving as a warning signal, will indicate to the user when to replace the worn strap.

The linemen's strap is fitted with tested drop-forged steel snap hooks and buckle and is available in various lengths.

Each strap is stamped with the date of manufacture. **Atlas Safety Equipment Co., Inc., 175-179 North 10th Street, Brooklyn 11, N. Y. (Item 304)**



Flexible Frame Goggle For Dust, Splash

A soft, flexible frame cushion-fits to the face. These goggles have plastic vents—open-louvered

front and rear for dust conditions, and open-louvered rear only for splash conditions. This product is available in clear or green frame with clear or green single lens.

Welsh Mfg. Co., Magnolia St., Providence, Rhode Island (Item 305)

For More Information—Circle Item Number on Reader Service Postcard



ULC Lists Gas Operated Alarms

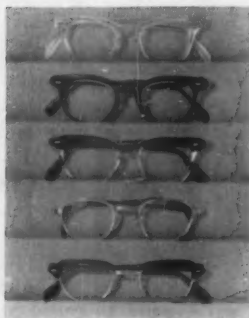
Falcon Alarm Company's automatic gas operated fire alarms have been listed by the Underwriters' Laboratories of Canada, Inc., under their inspection service.

These alarms reportedly are the first gas-powered units to be listed by the ULC and are

the first single station units of any type listed by the ULC.

A sight glass permits inspection to determine the level of the liquefied Freon gas, the power source. Components of the unit permit the horn to be located up to 250 ft from the detector. Modified components permit their use to form manual and automatic fire alarm systems for certain applications.

Falcon Alarm Co., Inc., Summit, N. J. (Item 306)



Safety Glasses

Sightgard safety eyewear is available in metal and acetate frames, temple styles, and rigid and adjustable nose pads. Custom fitting is possible through a range of lenses, bridges, and temple sizes. Side shields are available with the flesh and ebony acetate models. Also featured is a

universal bridge designed to simplify stocking and fitting problems.

The new line provides various types of lenses, covers, and plates. These include clear lenses in the standard S-7 shape; lightweight plastic lenses where pitting is a problem; and ultra-filter lenses for protection against glare and impact. Round 50mm lenses and plates are also available for chipper and welder eye protection, for filtering of sodium glare, for protection against pitting and spatter, and for use in visual reading of melt condition in steel operations.

MSA has also developed a package prescription service with the Sightgard eyewear line.

Frames for the Sightgard line are provided in acetate, metal, and acetate-on-metal. The acetate frames are resistant to combustion. The metal frames are corrosion-resistant, with 18 per cent nickel silver used in structural parts. In the acetate-on-metal style, strength is built into the bridge and endpiece areas.

A range of side shields provides a perforated wire mesh, insulated wire mesh, a solid acetate side in flesh or green colors, or a perforated acetate side in flesh or green.

Mine Safety Appliances Co., 201 North Braddock Ave., Pittsburgh 8, Pa. (Item 307)

For More Information—Circle Item Number on Reader Service Postcard

Stair and Floor Tiles

Slip resistant ALUNDUM stair and floor tiles are being sold.

ALUNDUM stair and floor tiles contain from 65 to 80 per cent aluminum oxide abrasive grain to insure gripping action for safe footing throughout the life of the tread.

These alundum stair and floor tiles are made in various standard sizes from 3 x 3 x 1/2 to 12 x 12 x 1 1/4 in. They are available in brown, red, gray, black, green and speckled white.

Norton Co., Worcester 6, Mass. (Item 308)



Lebus Ratchet Type Load Binder

A ratchet-type load binder, designed to get the last half link of chain in take-up, is being offered.

Features include rigid one-piece construction with no bolts or nuts, a rustproofed ratchet spring and heavy barrel. This load binder has forged alloy hooks, a one-

piece handle and requires no cheater to bind a load tight.

Light in weight to enable simple handling, yet with strength to break high test chain, the ratchet load binder has square threads which allow tightening and self cleaning.

It is available in three models to fit chain sizes of 3/8 in., 1/2 in. and 3/4 in. The R-7 model has an average breaking strength of 16,200 lbs.; the R-2 model, 26,000 lbs., and the R-C model, 37,000 lbs. All three models have an 8-in. take-up.

The ratchet type load binder will complement the Lebus load binder line which includes the standard, snubbing and releasing types.

American Hoist & Derrick Co., Crosby-Laughlin Div., Box 570, Fort Wayne, Ind. (Item 309)



Clamp Has Wide Grip Range

A device for those using a special opening "G" clamp increases this clamp's range of grips and eliminates need for another clamp where large variance in grip would ordinarily require its use.

A one-ton with 3/4-1 1/8-in. grip can be converted into a clamp having grip of 0-3/4 in. by slipping the adapter into position. This provides one clamp to handle 0-1 3/8 in. materials.

A three-ton 1 3/4-3 1/8 in. can be converted to 1/4-3 1/8 in., a clamp about one-half the weight of a large opening 0-3-in. clamp.

This adapter unit, with pad, can be replaced when worn. It slips in and out without use of tools and does not interfere with pad in clamp.

Merrill Brothers, Artic St., Maspeth, N. Y. (Item 310)



Cold Weather Work Glove

A process of impregnating jersey gloves with non-slip vinyl is said to give at least 10 times longer wear. Other benefits reported are safe grip, oil and water repellency, retention of flexibility, and the comfort of ordinary jersey.

The palm is heavily coated. The back is lightly impregnated to resist scuffing but let the fabric breathe. This glove, Tuf Duk, is recommended for outdoor work, cold rooms and refrigerated products handling. **Edmont, Inc., Coshocton, Ohio (Item 311)**



Control for Punch Presses

Designed for punch presses, a control now available can also be adapted to automated operations and progressive automated sequences. The Cycle-Chek system is de-

signed for dog type and air clutch presses and reportedly will eliminate die breakage and costly down time.

The system is electric with no electronic parts and can be serviced by electricians. There are three main components with visual indicators to keep the operator informed of the operating condition of the press.

In the detector switch individual swinging contact fingers can be slipped on or off independently without removal of the switch frame from its mounting. The ejected part causes the finger to swing out and engage the contact spring with a wiping action for positive electrical contact. The unit contains no magnets which might become shorted by minute metal particles.

Rehrich Safety Controls, 3730 East 26th St., Los Angeles 23, California (Item 312)



Drum and Barrel Truck

A drum and barrel truck, said to make it possible for one operator to place heavy drums on pallets, has been announced.

Designated EZY-ROL BARREL CART, the manufacturer says the design of this truck allows the barrel

to be carried at pallet height so in one forward motion the drum can be placed on a pallet with a minimum of operator effort. Drums reportedly can be safely lowered from pallets with this cart.

Although an extra set of wheels is primarily used on

For More Information—Circle Item Number on Reader Service Postcard

this truck to facilitate pallet loading, the four wheels carry the entire load, reducing operator effort when moving heavy drums.

The hazard of moving heavy drums down ramps or steep inclines can also be reduced with this truck, it is claimed, as it is available with two-wheel safety brakes which give the operator control of the load.

The main frame of this barrel truck is constructed from heavy steel tubing with a 1-in. diameter replaceable axle. It is available in aluminum where light weight is a factor.

Wheels are equipped with ball bearings to provide an easy roll, regardless of temperature or weather conditions. Solid rubber tires or pneumatic wheels are optional.

Valley Craft Products, Inc., 770 Jefferson Ave., Lake City, Minn. (Item 313)



Portable Extinguisher

Two fire extinguishers are being offered. Available in 2½ lb and 5 lb. capacities, these extinguishers are UL-approved for fires involving flammable liquids or electrical equipment. Both models are portable and have instant squeeze grip nozzles, enabling the user to direct a blanket of CO₂ gas at the heart of

the flame and smother the fire.

American Industrial Safety Equipment Co., 3500 Lakeside Ave., Cleveland 14, Ohio (Item 314)



Ear Protectors

Straightaway Ear Protectors emphasize comfort, without sacrificing high attenuation. Model 372-9A features a wide, extruded and flexible headband with low tension spring, and a weight of 11 oz.

A neoprene band with nylon braided cover holds the removable ear seals in

place. Filters of clover-leaf design trap more noise than their predecessors.

To integrate with any hard hat on the market, Model 372-20 HH comprises a pair of slim style, high attenuation, green domes fastened into a soft cloth harness held between the webbing and the top of the hat and by a strap of the same material under the chin.

Each of these two models is available with civilian or military-type communications systems.

Almost a third lighter than the 372-9A, Straightaway Model 372-20A weighs less than 8 oz. These protectors feature green silhouette domes, high attenuation.

Model 372-25 WH integrates Straightaway Ear Protectors of the 372-20A type with a Fibre-Metal welder's helmet.

David Clark Co., Inc., Worcester, Mass. (Item 315)



Wide-Vision Welding Helmets

Wide-vision welding helmets provide a large-view lens opening of more than 19 sq. in. Lenses are seated in a leakproof, nonelectrical conducting, neoprene holder for lens removal and replacement.

Metal splash or spatter bounces off and doesn't adhere to the impact- and fire-resistant holder. These helmets can be furnished in fiberglass or vulcanized fiber with snap-in Fit-Rite headgear or safety cap. Mountings are identical and interchangeable.

Flood Safety Products Co., 3035-37 West Lake Street, Chicago 12, Ill. (Item 316)

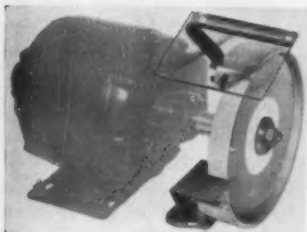


Chemical Workers Goggle Also for Chippers, Welders

A molded rubber goggle in forest green color is designed for welders and chippers as well as chemical workers.

Acid resistant, this product has soft-rolled edges, is comfortable, yet fits the face. The goggle features a large lens size, S-7 shape, providing wide-angle vision, and will fit over any modern eyeglass frames. Available with aluminum, non-corrosive vents (for welders and chippers) or without (for chemical workers).

Bausch & Lomb Inc., Rochester 2, N. Y. (Item 317)



Guard Has Adjust- able Eye Shield, Tool Rest

The Grinder Ga-R-est is a guard for a bench grinder that incorporates an adjustable eye shield with an adjustable tool rest.

This guard mounts independently on fractional horsepower motors (motors, 1725 to 3450 rpm, taken out of a washing machine, refrigerator etc.) used with standard motor arbors on which a 6-in. grinding wheel is mounted.

Appliance Engineering Co., 2052 N. Western Ave., Chicago, Illinois (Item 318)

6-Unit UL-Rated Extinguisher

A 2¾ lb. dry chemical pressurized type fire extinguisher has a 6-unit rating by the Underwriters' Laboratories.

With ¼-lb. more of a new powder, this extinguisher

For More Information—Circle Item

has put out 50 per cent more fire at Underwriters' Laboratories. These extinguishers carry the I.C.C. and Factory Mutual approval.

M. L. Snyder & Son, Inc., Jasper & York Streets, Philadelphia 25, Pa. (Item 319)



Carpincho Leather For Welder's Gloves

Imported Carpincho, the leather used in a line of welder's gloves, is said to resist heat shrinkage but remain soft and supple. These gloves also have reinforcement in the thumb crotch. They are available in 13½-in. gloves and mittens. A driver's-type glove is also in the line.

Singer Glove Mfg. Co., 860 Weed St., Chicago 22, Ill. (Item 320)



Electrical Safety Hats

A line of electrical safety hats has been announced.

Fabricated from new-formula plastic, the headgear has been designed

to offer double protection—from electrical shock as well as impact. The hats meet and exceed E.E.I. specifications.

Another feature is their ability to withstand 40 ft. lbs. without showing visible structural or material weakness. The tested penetration depth of the material is ¼-in., less than the ⅜-in. depth permitted by the specification.

The hat shell material is corrosion-resistant and maintenance free. It provides insulating safety and permits visual detection of minute damage. Standard color of the new line of hats is yellow.

The Boyer-Campbell Co., 801 West Baltimore Street, Detroit 2, Michigan (Item 321)



Hand Creams

Halene Aerosol hand cream with silicones added is available with modern Aerosol packaging. Halene is available in a 6 oz. Aerosol can.

Silicones repel water and water solutions. For those whose hands are being continually immersed in water, Halene acts as a barrier.

A. E. Halperin & Co., Inc., 75 Northampton Street, Boston 18, Mass. (Item 322)

Number on Reader Service Postcard



Add Firmhold Finish To Neoprene Gloves

Wil-Grip Firmhold Finish offers resistance to most oils, fats, greases, petroleum solvents and caustics. One of the 10 gloves sold under the Wil-Gard trademark, the Neoprene Wil-Grip Firmhold Finish is available in three weights of black neoprene and in two weights (smooth finish) of white neoprene.

Cross-hatches of material provide a rough, gripping surface molded into the fingers and palms of the gloves

to give gripping and holding friction on wet or slippery surfaces.

These gloves are allergen-free. The most sensitive hands don't react to it. The glove is tough and durable, and won't deteriorate from age or exposure to sunlight.

The Wilson Rubber Co., Canton, Ohio (Item 323)



Absorbent Helps Prevent Slipping

Zorb-All is a floor absorbent for prevention of slipping accidents on icy steps, sidewalks, drives, walkovers, parking lots and skidding of automobiles, trucks, materials-handling vehicles on drives, loading docks, ramps, and streets.

Not a chemical, Zorb-All won't irritate the skin, damage wood, metal or rubber, harm shrubs, grass, fabric, discolor or pit concrete. Angular particles don't melt ice, but resist breakdown under vehicular or foot traffic. Zorb-All is said to provide absorption of oils, grease, water, paints, inks, chemicals, other liquids.

Wyandotte Chemicals Corp., Wyandotte, Michigan (Item 324)



Air-Tight Headgear

Tite Seal Headgear produces an airtight seal with two adjustments—on top and in back. Contour fitting plastic allows fit on any size or shape head.

The seal is not dependent upon six buckles. The headgear is available on airline respirators and firm's

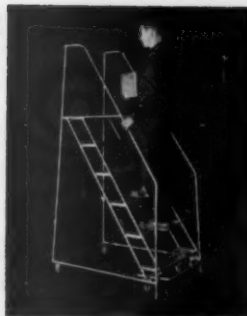
line of standard and Scotttomic gas masks.

It requires less wearer training time.

Straps have been eliminated. The mask and headgear are cleaned with soap and hot water.

Willson Products, Div. of Ray-O-Vac Co., 212 E. Washington Ave., Madison 10, Wisc. (Item 325)

For More Information—Circle Item



Steel Rolling Step Platforms

A line of all-steel rolling step platforms has mobility with stability. This line features a flared base for stability, and a foolproof caster locking device on the 6 through 12-ft. models.

The locking device automatically locks the ladder to the floor when the user

first steps on the ladder. A slight pressure on a release bar readies the unit for movement to a new position. One through five-step models are equipped with spring-loaded casters as standard equipment.

Other features include all-steel welded construction, and large, rubber tipped feet for solid footing.

These rolling rigid-locking platforms, painted in brilliant safety yellow or gleaming aluminum, are available for working heights to 15 ft. with safety treads of expanded metal (standard) or non-slip rubber or anti-skid grating.

Louisville Ladder Co., 1101 West Oak St., Louisville, Ky. (Item 326)



Drum Yoke for Overhead Hoist

A drum hoisting yoke has been designed for use wherever an overhead hoist is available and can also be adapted for use with a fork-lift

truck—making a drum dumper of your fork lift.

The drums are engaged by an attachable steel girdle made primarily for use with 55 gal. steel drums.

It is adaptable to fiber drums or other sizes of steel drums by using the proper size girdle.

Sterling Fleischman Co., Broomall, Pa. (Item 327)



Compact Protective Rainwear Suit

A protective rainwear suit composed of jacket, overalls, and hood, is now available at Davis-Jetsun Clothing. It is small enough to be folded into the glove compartment of a car.

Made of lightweight yellow vinyl film, these suits have electronically welded seams, plastic buttons, reinforced plastic button holes, and air vents under the arm. A full cut is featured for free action. The suit

is available in medium (36-40) and large (40-44), is resistant to oils, chemicals, and acids, will not stiffen at 20 degrees below zero, and is easily washed in detergent.

Davis-Emergency Equipment Co., 45 Halleck St., Newark 4, N. J. (Item 328)

Number on Reader Service Postcard

NEWS ITEMS



Guardian Safety Equipment Co.

Guardian Safety Equipment Co., (Division Safety Inc.) announces new office and warehouse at 37 East 21st St., Linden, N. J.

"Guardian" is the distributor for: Chicago Eye Shield, Scott Aviation, Johnson Williams, Fibre Metal, Medical Supply and other companies. The firm serves upstate New York, northern New Jersey, and metropolitan New York City.

Oxy-Catalyst, Inc.

Automotive Division of Oxy-Catalyst, Inc., Berwyn, Pa., announces appointment of these representatives for their line of exhaust purifiers for gasoline, LP gas, and diesel powered industrial vehicles:

Plowden Roberts, Columbia, S. C.—North Carolina, South Carolina, and Georgia; Fred Hess, Jr., Albuquerque, N. M.—New Mexico; J. P. Fuller, Inc., Elizabethton, Tenn.—Tennessee and Alabama; Rittiner Equipment Co., Gretna, La.—Louisiana and Arkansas.



Carl Sigler

Bauer & Black, Grove and Lehn and Fink.

International Film Bureau

International Film Bureau Inc., producer and distributor of 16mm films, has moved to new quarters at 332 South Michigan Ave., Chicago 4.



Frank A. Paul

Detectogas Instruments, Inc.

Detectogas Instruments, Inc. of Houston has announced appointment of Frank A. Paul as sales representative for the Detectogas Monitor, a gas safety device. Paul will work from the Houston office, but will also be active in the national marketing program for Detectogas.

Prior to joining the company, Mr. Paul was sales engineer for J. R. Dowdell & Co. and Chapman Valve Mfg. Co.



William Devlin

Granet Corp.

The Granet Corp. of Framingham, Mass., manufacturers of coated fabric work gloves, announces the appointment of William Devlin of Chicago as its midwestern representative. He will work in distributor relations, sales and service.

American LaFrance

Harry E. Butters, advertising manager for fire protection equipment, has retired, effective October 1st, after 43 years with American LaFrance, a division of Sterling Precision Corp., Elmira, N. Y.

Mr. Butters recently has been in charge of advertising and promotion of the company's lines of industrial and consumer fire protection equipment.

I. Sloane Palmer is now advertising manager for fire protection equipment.



Deric B. Popler

Fibre-Metal Products Co.

A new southeastern warehouse has been announced by The Fibre-Metal Products Company of Chester, Pa. Fibre-Metal Southeast, Inc. of Decatur, Ga., will distribute Fibre-Metal products, Gendale Optical Co. products and J. M. Ragle Industries products to welding and safety supply distributors of the southeastern United States.

Services will include shipment from Decatur stocks, field sales assistance and extension of factory services.

Operations will commence October 3, 1960, and will be directed and guided by Deric B. Popler, general manager.



Joseph J. Hauser

Joseph J. Hauser of Philadelphia has joined Fibre-Metal Southeast's sales staff. His territory will include Alabama, North Carolina, South Carolina, and parts of Florida and Tennessee.

Carlson Sales Co.

J. Stone Carlson, of Carlson Sales Co., Needham, Mass., has been named sales representative in the New England area for industrial glove products manufactured by The Pioneer Rubber Co. of Willard, Ohio.

Mr. Carlson will represent Pioneer's Stanzoil, Stanflex, Pacemaker, Sheergrip and Nimble Fingers industrial gloves in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont (except in the County of Bennington, Vt.).

Diary

—From page 52

Joe, I tell you we can do something with this material, bad as it is. Now let's you and I . . ." and I was off onto a hard sell of a training program I've been wanting to test out.

When I saw Bill Malloy, the Lemmerton safety engineer, and at his request went into a huddle with his superintendent, I was a guy with a blueprint in his hands, table of measurements, a set of statistics on foot and vehicular traffic. I was doing nothing but saying, "This is the problem. There are several ways to solve it. Let's consider the alternatives." I was, in a word, just about as emotional as an electronic computer.

I took the problem of me home to the world's leading authority on the subject—my wife. Sue laughed at my dead-serious presentation of the case. "Look," she said, "there are simple, one-piece people, who can work with simple, one-piece methods. You aren't one of them. You're about one-third eager mis-

sionary, about one-third prophet of doom, and about one-third technician. It doesn't make a bad balance. Go along with it."

I looked a little anxious. "Still," I said, "a man ought to, in dealing with the outside world, adapt to the needs of the people he meets."

"You adapt," Sue said. "Sometimes you adapt to other people's needs too darned well. Like mooning around hospital corridors when somebody has a sore shinbone. But I wouldn't change you. Maybe I married you because I liked the combination of sentimentalist and tough guy, of worrier and optimist, of hunch-player and scientific engineer. Maybe if you were the age of your son, I'd be trying to reshape you like I'm trying to shape him. But not now, dear. You may not be the perfect safety engineer, but you're the best you'll ever be, and that best is, by the trade's standards, pretty good. Let it rest there."

I suppose she's right. And I suppose Gorvan and Marron and Sites and the others are right, too.

Maybe even I am right.

Ventilate and Heat that manhole Safely



with a

MoPeCo propane VENTILATING HEATER

Fresh Air... heated fresh air in one portable unit!

- Weighs only 62 pounds
- 300 to 800 cfm fresh air
- 10° to 96° temperature rise
- Propane or Butane fuel
- 10' L.P.G. hose standard
- Safe fresh air blown into manhole at all times.
- Eliminates manhole explosion and oxygen deficiency accidents.

UL listed

Order through your favorite distributor.
WRITE FOR ILLUSTRATED BROCHURE SHOWING ALL MoPeCo MODELS.

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Circle Item No. 93—Reader Service Card

National Safety News, November, 1960



MINIATURE 2-WAY RADIO SYSTEM Keeps YOU in CONTACT in ANY Situation; ANY TIME, ANYWHERE!

the SEISCOR TELEPATH

... is a portable industrial quality communications system that becomes a part of your wearing apparel. It is engineered for short-range applications where dependability and convenience of use are essential. Precision circuit and durable construction provide extremely low maintenance and trouble-free operation!

- Fully transistorized printed circuit
- Crystal-controlled superheterodyne receiver
- Crystal-controlled transmitter
- Long battery life
- For any single frequency between 20-55 mc., A.M.
- No license required on 27 mc. units.

Let Seiscor Engineers analyze your short-range communications problems. Example: Special units have been designed into protective clothing for crash-crew fire fighters.

FIND OUT TODAY HOW TELEPATH CAN IMPROVE YOUR SHORT RANGE COMMUNICATIONS!

Write for name of nearest TELEPATH dealer, and complete information on versatile TELEPATH communications.

SEISCOR

A DIVISION OF SEISMOGRAPH SERVICE CORPORATION
BOX 1590, TULSA, OKLAHOMA



MODEL HR
Hardhat with built-in transceiver, antenna, earphones and mike. High and low noise level models available.



MODEL BR
Belt-clip transceiver and headset with built-in antenna, earphones and mike. High and low noise level models available.



TRADE PUBLICATIONS

These trade publications will keep you up-to-the-minute on new developments in safety equipment and health products. All catalogs are free, and will be sent without obligation. Just circle publication number on the Reader Service Postcard.

Safety Signs

Ready Made Sign Co., Inc., 115 Worth Street, New York 13, N. Y. announces the publication of their latest catalog of stock signs. In addition to standard industrial signs it includes signs covering fire prevention, radiation, information, traffic, civil defense and a wide collection of signs for every business need. The Ready Made Sign Company has been serving industry since 1861. They are members of the National Safety Council and all signs are manufactured in accordance with The American Standards Association Specifications for industrial accident signs.

For more details circle No. 400
on enclosed return postal card.

Floor Cleaner

Associated Just Distributors, Inc., 702 South Wolfe St., Baltimore 31, Md., announces a new product for cleaning floors. It lifts out dirt, grime, and embedded soil, suspending it in solution for rinsing. The manufacturer claims there is no harmful penetration of pores, loss of vital oils, plasticizers, or resins; no grinding, abrasive action to scratch or roughen surfaces; no redistribution of soil onto the surface or back into the pores. Cleaning efficiency is claimed even in cold water. Literature is available.

For more details circle No. 401
on enclosed return postal card.

Asbestos-Cement Pipe for Fire Lines

Advantages of asbestos-cement Transite pipe for fire protection systems in industrial plants are described and illustrated in an 8-page brochure published by Johns-Manville Corp., 22 East 40th St., New York 16. Described are performance properties related to dependable protection and to savings in cost and installation. Among these characteristics are corrosion resistant, high flow capacity, described weight-strength ratio and "Ring-Tite" joints. Also illustrated is a typical arrangement of a plant fire protection system from tank or well to connections to building supply and hydrants, including correct location of fittings and outlets.

For more details circle No. 402
on enclosed return postal card.

Safety Shoes

The 1961 catalog of Iron Age steel toe safety shoes is available. Included are safety oxfords patterned after dress and work shoes. Also mentioned are safety rubber footwear. Iron Age Div., H. Childs Co., Inc., Pittsburgh 12, Pa.

For more details circle No. 403
on enclosed return postal card.

Vacuum Lifters

Literature is available from the Atlantic India Rubber Works, Inc., on vacuum lifters that have been designed for speeding punch press work and can be used with smooth-surface materials. Other applications are plastic molding, metal fabricating, glass handling and industries involving smooth, non-porous surfaces. They come in various sizes, from the

one-finger lifter for light objects or raising corners for a better grip to the two-man vacuum lifter for heavy gauge metal, marble slabs and heavy plate glass.

For more details circle No. 404
on enclosed return postal card.

Safety Glasses

Brochures announce line of six basic models of safety glasses, made by the American Optical Co., Southbridge, Mass. Features are wider temples, a seven-barrel hinge said to increase strength where frame and temple meet, screw construction reportedly eliminating fall out of screws, wider endpieces for strength, a safety ridge which tends to hold the lens in place under impact, non-reflecting mesh side shields, and sturdy frame.

For more details circle No. 405
on enclosed return postal card.

Heat-Resistant Paint

A 4-page engineering specification bulletin for Heat-Rem H-170 has been announced by Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio. Described are the product's uses, composition, application and storage stability. The folder discusses results of tests that show H-170's resistance to heat of up to 1700 deg., salt spray, oxidation, oil damage and stress.

For more details circle No. 406
on enclosed return postal card.

Gamma Spectrometer System

Known as the GSS-1, the system mentioned in available literature uses an analytical principle to obtain high resolution over a wide range of spectra energy. The system can analyze emitters in the approximate energy range from soft X-rays to more than 6 mev. At the same time, "dark current" background is said to be eliminated. Illustrated are graphs showing the spectra of various radioisotopes including cobalt-60, lead-210, cesium-137, radium, uranium ore, euxenite ore, iron-59, chromium-51, and iodine-131.

For more details circle No. 407
on enclosed return postal card.

Strapping Tools

Catalog SPD-238 contains a specification chart that lists applications for four electric-powered and eight air-powered tools. Also covered are suspension brackets and hooks. Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47.

For more details circle No. 408
on enclosed return postal card.

Saws

Here's a 34-page handbook on selection and use of hack saw and band saw blades for cutting ferrous and nonferrous metals, hard plastics, and rubber. The publication has subject index and photos. Nicholson File Co., 23 Acorn St., Providence 1, R. I.

For more details circle No. 409
on enclosed return postal card.

Lift Trucks

Available from the Automatic Transportation Co., 101 W. 8th Street, Chicago 20 is this 12-page brochure that discusses material-handling operations of the future. The booklet tells how the company designs and develops trucks for tomorrow.

For more details circle No. 410
on enclosed return postal card.

Dust Separators

Selection, installation, and performance data for Dual-Clone separators are outlined in bulletin D-20. Multiple groupings handle several systems of dust collection and higher air volumes. The Day Co., 810 Third Ave., N.E., Minneapolis 13, Minn.

For more details circle No. 411
on enclosed return postal card.

Electric Motors

General and special-purpose motors for most fractional and integral horsepower needs are listed in this 8-page illustrated motor selector publication. Included is information on generators, bench grinders, speed reducers, and other products. Howell Electric Motors Co., 409 N. Roosevelt St., Howell, Mich.

For more details circle No. 412
on enclosed return postal card.

Flaw Detector

Ultrasonic flaw detection is the subject of this 8-page bulletin T-200. Covered are the advantages of what is reported a compact, portable, high-performance instrument manufactured by Branson Instrument, Inc., 37 Brown House Rd., Stamford, Conn. Included are specifications and applications.

For more details circle No. 413
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Air Compressors

Centrifugal compressors with capacities from 5,000 to 38,000 cfm. and 1,000 to 8,000 bhp. are described in 30-page bulletin No. 175. Included are design features, frame sizes, with cut-away drawings, and photos. Clark Bros. Co., 600 Lincoln Ave., Olean, N.Y.

For more details circle No. 414
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Temperature Controllers

Booklet MC-185A describes Series 560 electronic indicating temperature controllers. The portable instruments cover a range of -100 to 600 F. Full specifications are covered. Fenwal Inc., 32 Pleasant St., Ashland, Mass.

For more details circle No. 415
on enclosed return postal card.

Hand Tools

Catalog No. H-9 has 16 pages of information covering such hand tools as wrenches, pliers, cutters, screw drivers, punches, chisels, socket sets, extensions, tool chests, feeler gages, and others. Owatonna Tool Co., Owatonna, Minn.

For more details circle No. 416
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Thermocouples

Hard-pack, small-diameter, mineral-insulated thermocouples are covered in 16-page catalog G100-4. Contained is a guide to Megopak bulk material, elements, and complete assemblies. Minneapolis-Honeywell Regulator Co., 2747 4th Avenue, S., Minneapolis 8, Minn.

For more details circle No. 417
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Air Sampler

This 4-page brochure from the Staplex Co., 771 Fifth Ave., Brooklyn 32, N.Y., describes a unit that measures air containing particles as small as one 100th of a micron in diameter. It has a pump and high-speed motor built into the casing. For outdoor, indoor sampling jobs.

For more details circle No. 418
on enclosed return postal card.

Hoists-Trolleys-Cranes

Bulletin DH-28A has 8 pages of data on motor-operated hoists with 300 to 20,000-lb. capacities, lightweight hand hoists, and three types of cranes. Weights and dimensions are given. American Chain & Cable Co., Inc.

For more details circle No. 419
on enclosed return postal card.

Triplex Masts

Bulletin 2410A concerns triplex masts for gasoline-powered and electric lift trucks. For use where there are low ceilings and doorways, as well as high stacking jobs. The Yale & Towne Mfg. Co., 405 Lexington Ave., New York 17.

For more details circle No. 420
on enclosed return postal card.

Wire Rope

This 156-page catalog contains wire rope information and performance details on equipment such as hoists, cranes, drivers. Bethlehem Steel Co., Bethlehem, Pa.

For more details circle No. 421
on enclosed return postal card.

Flame Resistant Enamel

Literature is available, based on a non-volatile chlorinated alkyd resin solution that was subject to a test under which paint films on a steel panel wouldn't ignite after 30 seconds of electrical heating which reached a temperature of 2300 F. Hooker Chemical Corp., Buffalo & 47th, Niagara Falls, N.Y.

For more details circle No. 422
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Vinyl Heat-Reactive Tubing

Information is on hand describing tubing that shrinks under heat to provide a covering for symmetrical or gently contoured shapes. Now available in transparent or in unprinted black. For objects 3/64 to 5 in. outside dimension. Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minn.

For more details circle No. 423
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Glass Spray Coating

This is a spray coating said to provide a corrosion-resistant surface to metals, wood, and concrete. A homogeneous mixture of the Flake, plus resin, fillers, accelerator, and pigment, if desired. The material is sprayed on, then rolled for a smooth uniform surface. Owens-Corning Fiberglass Corp., P.O. Box 901, Toledo 1, Ohio. Literature is available.

For more details circle No. 424
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Rubber-Cushioned Ceramic Tile

Made of 9-in. square preformed rubber grid that holds 64 ceramic tiles. The maker says this ceramic floor is quiet and easy on the feet. Available in 12 color combinations. The United States Ceramic Tile Co., 217 4th Street, N.E., Canton 2, Ohio. Brochures are available.

For more details circle No. 425
on enclosed return postal card.

Heating Elements

Nickel-chromium alloy for heating elements in controlled atmosphere furnaces is detailed in 8-page bulletin 110. Included are typical life and temperature-resistance curves and other test data. Hoskins Mfg. Co., 4445 Lawton Ave., Detroit 8, Mich. Literature on request.

For more details circle No. 426
on enclosed return postal card.

Ball Valve

Information is available regarding this valve, said to offer no resistance of flow, creating no turbulence or pressure drop. Mounts in any position. Optional ratchet opens or closes valve easily. In 3/4 to 2-in. sizes, pressures to 1000 psi. Bessler Corp., 4053 Harlan St. Oakland 8, Calif.

For more details circle No. 427
on enclosed return postal card.

Mobile Oil Filter

As indicated in available literature, this filter gets rid of contaminants of 0.5 or 3.0 microns. Change in filtering is made by replacing the filter element and re-setting panel valve. It cleans and recirculates continuously, stores, then recirculates using a built-in 20 gal. reservoir. Walter Kidde & Co., 675 Main St., Belleville 9, N.J.

For more details circle No. 428
on enclosed return postal card.

Safety Switch

Available in sizes from 30 to 60 amp., 250 to 600 v., with double blades to minimize pitting and burning. Other features are make-and-break mechanism; wiring space for installation; double insulation and are snuffers that minimize damage. Clark Controller Co., 1146 E. 152nd St., Cleveland 10, Ohio. Information is on hand.

For more details circle No. 429
on enclosed return postal card.

Voltage Tester

Here is a portable D-C high-voltage tester for production, maintenance and field testing of motors, transformers, cables, and insulation to 5000 v. It lights up automatically to show failures. Weighs 20 lb. and operates on 110 v. a-c. Associated Research, Inc., 3758 W. Belmont Ave., Chicago 18. Literature on request.

For more details circle No. 430
on enclosed return postal card.

Drip-Proof Motor

Information is now on hand concerning this 20 to 40 hp a-c. motor, said to be shielded five ways against external hazards. Featured is a splash-resistant enclosure, a labyrinth seal on output shaft, double-shielded ball bearings, high dielectric winding insulation, and bearing cup. Sterling Electric Motors, Inc., 5401 Anaheim-Telegraph Rd., Los Angeles 22, Calif.

For more details circle No. 431
on enclosed return postal card.

Electro Selector

A pocket slide chart to provide resistance welding data is available from Ampco Metal, Inc., Box 2004, Milwaukee 1, Wis. The chart selects proper electrodes for joining commonly-welded ferrous and nonferrous alloys. Correct top and bottom electrodes are indicated for more than 160 combinations of alloys. Also included is data for determining proper spot welding and seam welding schedules for various thicknesses of low carbon steel, with a conversion table for other alloys.

For more details circle No. 432
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National Safety News
November, 1960

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National Safety News
November, 1960

Designed to further simplify your Safety Glass inventory

NOW

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New CESCO Polyfit Bridge and New CESCO Interchangeable Temples

• Here's how to go all the way in simplifying inventory with a single safety glass that will fit the vast majority of your workers. New CESCO Polyfit frames have not one but two features to make them adaptable to the widest range of nose and facial contours. New Polyfit bridge design is amazingly comfortable on most individuals—thus eliminating the need to carry a large inventory of bridge sizes.

But in addition, CESCO Polyfit frames also feature gleaming nickel-silver temples which are interchangeable with other CESCO plastic frame glasses or with most safety glasses equipped with 5-barrel hinges—regardless of color. Sur-Loc pins fasten temples to frame. Tapered temples come in two styles—cable or spatula. Polyfit frames in flesh tone plastic are available with or without side shields.

- Your choice of two sizes: No. 316 (46 x 39mm), No. 318 (48 x 41mm)
- Popular F7 shape lenses are removable for easy "on-the-spot" repair

*Ask your distributor to show you the New CESCO Polyfit safety glasses
He'll also be happy to introduce you to the complete line of CESCO head and eye protective equipment
There's a CESCO distributor located in most major cities*



WITH SIDE SHIELDS

For total enclosure protection, CESCO Polyfit frames also come equipped with perforated plastic side shields. They offer the same outstanding features as the spectacles described above.

- Two Sizes: No. 316S (46 x 39mm), No. 318S (48 x 41mm)



CESCO

FOR SAFETY



CHICAGO EYE SHIELD COMPANY
2000 West Madison Street, Chicago, ILL. 60612

You get greater safety,
better wearer acceptance with new
AO "DURA Safe" GLASSES



These new Durasafe safety glasses will protect against 80% of the eye hazards in the average industrial plant with a full eye protection program.* This is a complete new line, just introduced by AO. It has been engineered and designed for greater safety, better wearer acceptance. Compare some of these features:

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- Eyewire and bridge made stronger. Groove in eyewire takes 3mm thick lens. Higher back bevel prevents impact pushing lens through.

- New, nonreflecting, acetate-bound, wire mesh side shields available. Give 100% more ventilation, better side vision. Fogging is minimized.
- Durasafe glasses give widest range of colors available, both solids and two-tone, with and without side shields. Wider, stronger frame temples are plastic spatula, comfort cable or all-new anodized aluminum spatula types. Full range of bridge and eye sizes to fit everyone—in safety Rx or planoglasses. AO monogram on frames and lenses identifies safety glasses at a glance.

You can't find any other glasses that will match the new Durasafe line. Your nearest AO Safety Products Representative can supply you now.

**Other types of AO safety goggles are needed to cover special hazards.*

Your Surest Protection . . . AO SURE-GUARD GLASSES

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